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In This Issue

About the Authors

Montanans are eagerly anticipating the performance of the newly apportioned legislature elected November 8. The article, "Reapportionment and Partisan Preference in the 1966 Elections," by Dr. Ellis Waldron, Professor of Political Science at the University of Montana, analyzes the effects of reapportionment on the membership of the 1967 legislature. This article is Dr. Waldron's third for *Quarterly* readers concerning the problems, possible solutions, and probable effects of reapportionment. The Winter 1965 issue featured a well-received report on the "Background and Priorities for Legislative Reapportionment in Montana," and "Montana's 1966 Legislative Apportionment Amendment," appeared in the Spring 1966 issue.

Professor Waldron has taught political science at the University of Montana since 1950, except for 1964, which he spent at the Harvard Law School as a Fellow in Law and Political Science. He was Graduate Dean at the University of Montana from 1957 to 1961. He holds an A.B. degree from Ohio State University and M.A. and Ph.D. degrees in political science from the University of Wisconsin.

He prepared a *Legislative Handbook* for the Montana Legislative Council in 1957, which has just been reissued with substantial revision by the Council. He is the author of *Montana Politics Since 1864—An Atlas of Elections,* published by the University Press in 1958; and *Municipal Facilities and Services in Montana (1961).* He participated in the urban planning studies of the Upper Midwest Economic Study and contributed to its 1963 report, *The Why and How of Community Planning.*

Dr. John H. Wicks is a member of the Task Force of the Montana Legislative Council, a group commissioned to analyze and make recommendations for changes in the Montana Tax structure. In this issue of the *Quarterly,* Dr. Wicks presents two timely articles: the first, "Who Pays Taxes in Montana," deals with the burden of taxes from the viewpoint of fairness and equity; the second, "The Case for the Montana Tax Study Recommendations," evaluates the recommendations of the Task Force.

Professor Wicks received his B.A. degree from the University of South Dakota and his M.A. and Ph.D. degrees from the

University of Illinois. He taught at Augustana College, Western State College of Colorado, and The Ohio State University before joining the University of Montana's Department of Economics in 1964.

Dr. Wicks has published extensively in professional journals and in previous issues of the *Quarterly.*

A third article concerning taxation has been written by Professor Maurice C. Taylor. Professor Taylor is serving as Visiting Professor of Business Administration at the University of Montana during the 1966-67 academic year. For the past sixteen years he has been a member of the Economics and Agricultural Economics faculty at Montana State University. Prior to coming to Montana he taught economics and agricultural economics for three years at Washington State University.

Professor Taylor received a Baccalaureate degree from Oklahoma State University in 1942 and a Master's degree at Washington State University in 1947. He studied economics at the University of Chicago in 1948-49 and 1952-53.

Professor Taylor is the author of more than fifty articles and papers published as bulletins, journal articles, magazine and newspaper articles and monographs. He has been a member of the various Montana highway fact-finding committees and is currently a member of the Legislative Council's Taxation Task Force.

The article, "Montana's Recreation Challenge" by Mrs. Elizabeth Hannum, appearing in this issue of the *Quarterly,* is a reprint from the proceedings of the statewide Recreation Planning Conference, held in Missoula in April of 1966.

Mrs. Hannum received her B.A. degree from Bennington College in Vermont and has done graduate work at the University of Aix-Marseilles (France), Colorado College, and the University of Montana. Prior to joining the staff of the University of Montana's School of Forestry as a publications specialist, she worked in publishing and film production and as secretary to playwright Arthur Miller.

Other professional activities of Mrs. Hannum include speaking to public groups on Montana conservation issues; active participation in programs of the Montana Wildlife Federation, Western Montana Fish and Game Association, and the Montana Wilderness Association; she has also served as the organization director of wilderness trips for the Montana Wilderness Association and the national Wilderness Society.

Mrs. Hannum's publications include *Scientific Writing for the General Public,* Proceedings of the Twenty-fifth Annual

Meeting of the Montana Academy of Sciences; *Homo Tremuloides and the Agency Image* (with W. Leslie Pengelly), Proceedings of the 1965 Annual Meeting of the Western Association of Fish and Game Commissioners; *The Forest Products Industry in Montana* (with Arnold W. Bolle and William K. Gibson), Bulletin No. 31, Montana Forest and Conservation Experiment Station; the present article, and articles on conservation in the *Great Falls Tribune* and the *Missoulian.*

Mrs. Hannum holds memberships in numerous wildlife societies and conservation organizations as well as in two honorary fraternities, Xi Sigma Pi and Phi Sigma.

Dr. Norman E. Taylor, Director of the Bureau of Business and Economic Research, is the author of "Some Economic Aspects of Controlled Burning." He received both his bachelor's degree in Economics and M.B.A. degree in Marketing from the University of California at Berkeley, and his Ph.D. from the University of Minnesota. Professor Taylor has taught at Utah State University, the University of Minnesota, and the University of Oregon, where he was Assistant Director of that University's Bureau of Business and Economic Research and where he also founded and directed the Forest Industries Management Center.

Dr. Taylor has had extensive business and consulting experience. He has been associated with such organizations as the Bureau of Indian Affairs, the U. S. Forest Service, the National Park Service, the Office of Price Stabilization (Minneapolis), the Small Business Administration, the State Planning Board, and the Interim Legislative Commission; in addition he has been a consultant for numerous private firms.

He is a member of the American Economic Association, American Marketing Association, Forest Products Research Society, American Forestry Association, and the Montana Natural Resources Council. Dr. Taylor is a frequent guest lecturer and conference participant.

From the Director's Desk . . .

With this issue we celebrate four years of publication. This gives us some pleasure since there were a number of people who predicted a life for the infant *Quarterly* of one, or at most, two years. We have survived the "terrible twos" that our own children successfully negotiated, and also the "frustrating fours." As we look ahead to years five and beyond we are still optimistic. We no longer are supervising an infant but a lusty child; a child not yet adult but a being with promise and the character to survive and grow.

Our growth in circulation, we believe, is a reflection of our editorial and publication policies. We have not been able in each issue to have an article for everyone, but we feel we have achieved a balance of topics in the issues of any one year. We have sought accuracy and logic in our essays and resisted the temptation to slip in superficial, although popular, polemics. We have not ducked the responsibility to air controversies, provided the article in question was fair and informative; and we appear to have achieved the goal of being read, to judge by the mailbag. Almost one article in four hits a tender nerve somewhere and evokes a response—often complimentary, but frequently critical. This occasional disagreement between an author and our readers, however, is to be expected. It is a source of pride to us that many readers have acknowledged either that they were forced to "rethink" their positions on some problem or were able to take a position where they had none before.

In an early issue of the *Montana Business Quarterly,* we stated that we would offer our subscribers thought-provoking articles not likely to be available from other sources. A glance at this issue's contents illustrates clearly this policy. Few more topical or pertinent issues will face Montanans in the next two years than taxes, legislative responsibilities, and the challenges of recreation.

Norman E. Taylor

Director

Reapportionment and Political Partisanship in the 1966 Montana Legislative Election

DR. ELLIS WALDRON
Professor, Political Science
University of Montana

The 40th Legislative Assembly which convenes in Helena on January 2 will have more than usual interest for Montana's legislature watchers. For the first time since 1889 an entire Legislative Assembly has been newly elected as a consequence of judicial reapportionment in 1965. For the first time since territorial days the Senate will represent people rather than counties, and for the first time since the county-busting era of World War I representation in the House of Representatives will closely reflect the population of every election district. Reapportionment will work some important changes in legislative attitudes and responsiveness to certain kinds of problems. But changes of response will be halting and uncertain at the outset. It would be easy to exaggerate the probable early effect of reapportionment upon the Montana Legislative Assembly.

Unofficial preliminary reports of the November 8, 1966 legislative elections permit a few profiles of the 1967 Legislature:

1. In the House of Representatives a sharp shift occurred from Democratic to Republican control. The number of house seats was increased from 94 to 104 by reapportionment, and Republicans apparently will occupy 64 seats, Democrats 40. In percentages, Republicans went from a minority of 39 percent in 1965, to a majority of 60 percent in 1967.

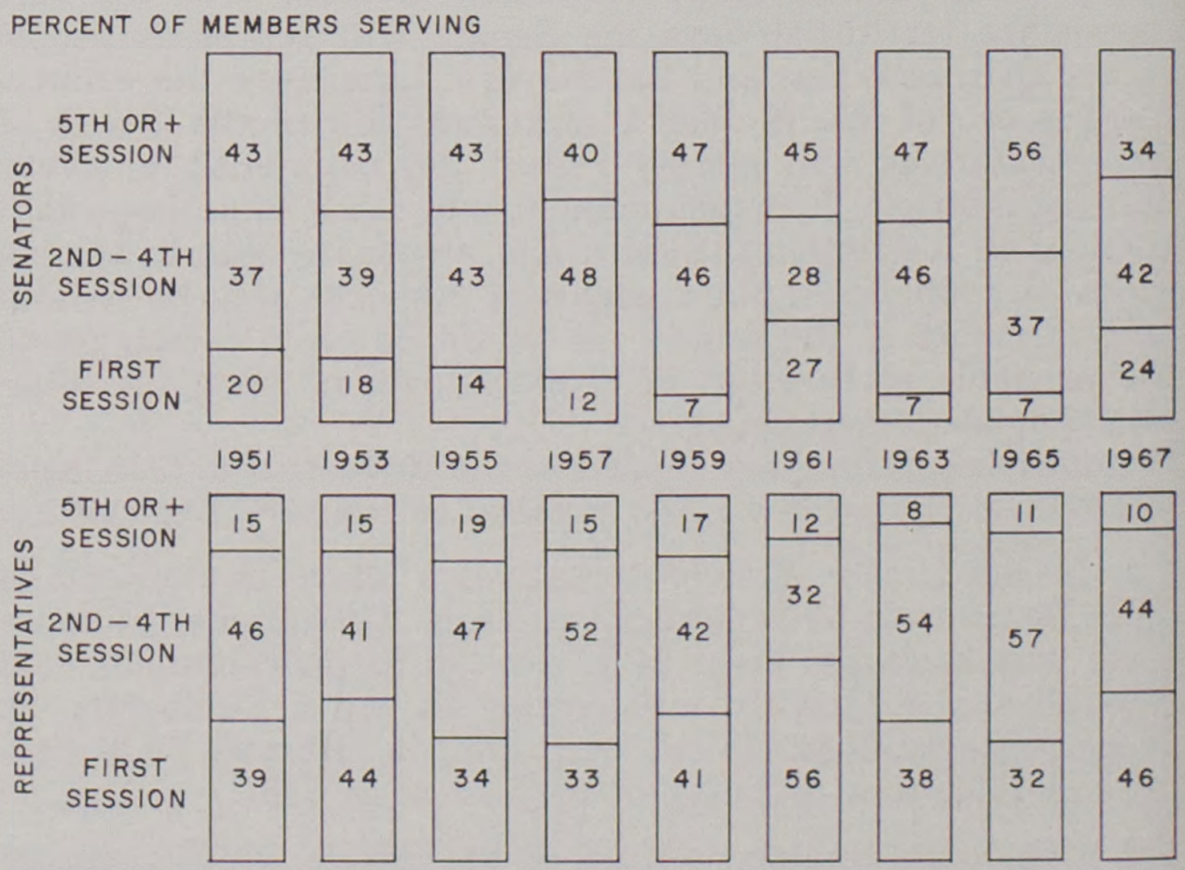
2. Democrats retained control of the Senate which reapportionment had reduced from 56 to 55 members. Democrats hold 30 seats, and the Republicans 25. But the Democratic Senate strength which had peaked in 1961 had dropped again, by a few percentage points: Democrats held 68 percent in 1961, 63 percent in 1963, 57 percent in 1965, and 55 percent in 1967. In the face of strong Republican gains in the House, retention of Democratic strength in the Senate calls for some explanation. If there were a Republican "tide" running in 1966, why did

it not reach the Senate—particularly since all senators, like all representatives, were elected anew for the 1967 session? We will return to this question.

3. Experience will be at a premium in the House of Representatives where 46 percent will sit in a legislative chamber for the first time. The number of freshmen representatives has exceeded this percentage in only one of eight prior sessions.

LEGISLATIVE EXPERIENCE OF MONTANA LEGISLATORS, 1951-1967: SESSIONS SERVED

Note: Tabulation for both houses is based upon the number of 60-day biennial sessions served in either house. Senators elected for two-session, four-year terms, Representatives for one-session biennial terms. There were no special sessions during the period surveyed.



4. The 1967 Senate will be fairly rich in experience because many incumbents were returned, while experienced representatives gained newly-opened Senate seats in many districts. Yet 24 percent of the Senate will be freshmen without prior legislative experience, as compared with seven percent first-session legislators in two preceding Senates.

5. The ratification of the 1966 apportionment amendment to the state Constitution opens the door for the 1967 Legislative Assembly to break up multi-member representation in the populous counties by subdistricting counties into single-member districts. Repeal of Article V, section 45 of the state Constitution respecting legislative vacancies suggests the need for new legislation to resolve doubts about the effect of old statutes and about the manner and propriety of gubernatorial appointment to fill legislative vacancies under Article VII, section 7 of the Constitution.[1]

6. Information on occupations of 1967 legislators is not yet available. Presumably, reapportionment will reduce the number of farmers, ranchers, and stockmen who comprised half of the Senate and more than a third of the House in the 1963 and 1965 sessions.

7. The effect of reapportionment in the 1966 election is an absorbing question which will be analyzed in the balance of this article. Democrats in particular may be concerned with this question because they lost control of the House and saw their Senate majority reduced to five seats. Republicans also will concern themselves with reapportionment effects if they wish to consolidate their gains.

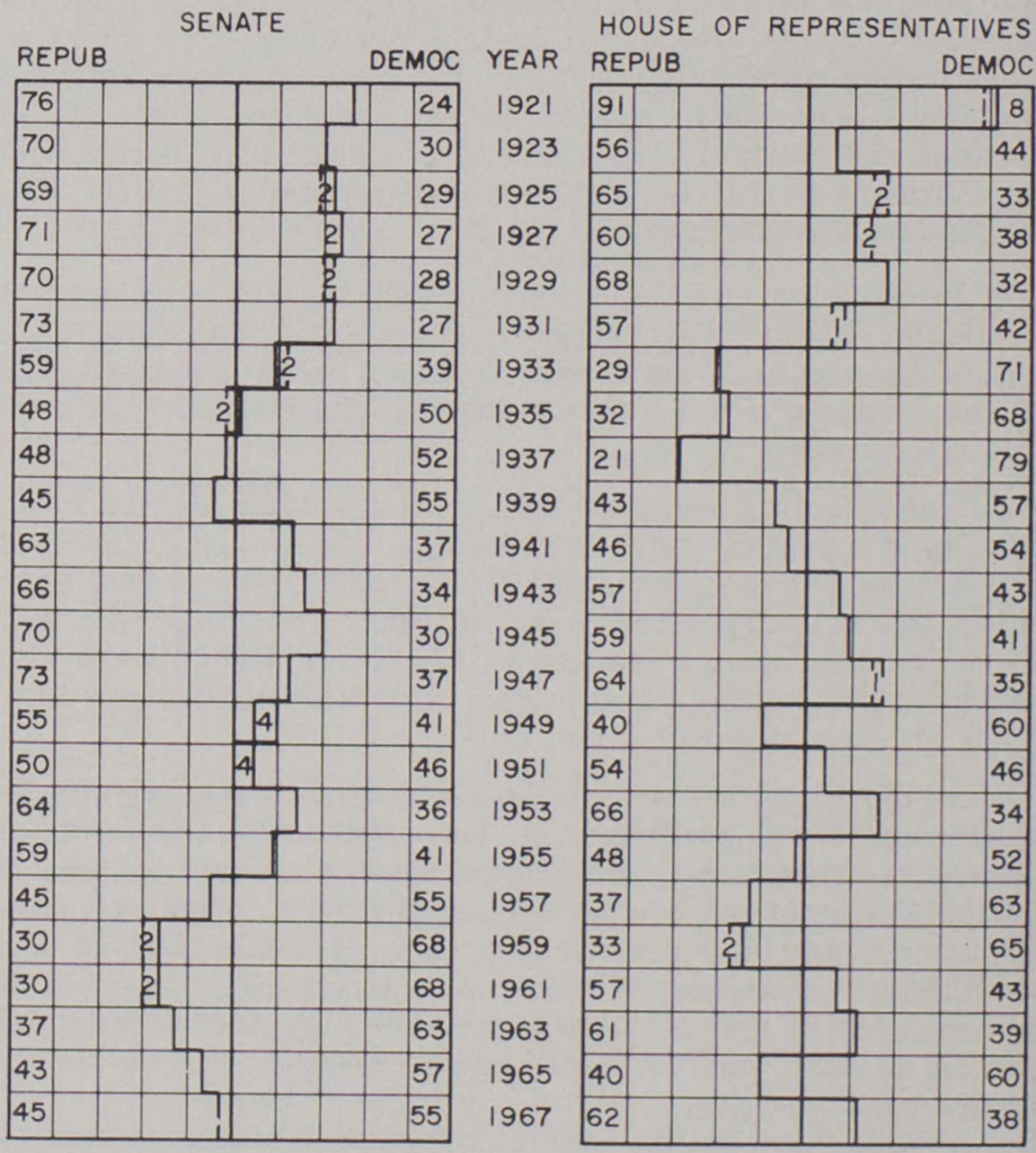
How much of the 1966 legislative election results should be attributed to reapportionment? How much was the result of Republican recovery in an off-year election, after the debacle of 1964? How much can be explained by the influence of incumbency, and the presence or lack of experience of the candidates? Were the 1964 legislative elections the product of unusual forces and circumstances attending the presidential contest of that year? None of these questions can be simply answered.

For three-quarters of a century the balance of partisan political control in the Montana Legislative Assembly has alternated with a curious tide-like regularity which is easier to observe than to explain. The phenomenon is graphically shown in an accompanying chart of "Political Party Balance in the Montana Legislative Assembly." Party strength is shown

[1]Some implications of the choice between multi-member and single-member districts were explored in the writer's prior articles, *Montana Business Quarterly*, Winter 1965, pp. 111-123; *Montana Business Quarterly*, Spring 1966, pp. 14-25.

POLITICAL PARTY BALANCE IN THE MONTANA LEGISLATIVE ASSEMBLY, 1921-1967

Shown as Percentages of Total Chamber Membership



as a bar graph of the percentage of total membership in each session. Several obvious features may be mentioned. One is the wider alternation of control in the House of Representatives. Elected in its entirety each biennium, House membership suggests and possibly exaggerates partisan trends. Democrats were almost wiped out in 1921 while Republican membership dropped to less than 25 percent in 1937.

The "damping" effect of overlapping four-year Senate terms probably explains the less violent swings of party membership

in that chamber. But term may not explain the fact that the Senate has been notably more Republican than Democratic over the years since 1889 with the possible exception of the most recent decade. Democratic state Senate majorities approached 60 percent only three times prior to 1959 while Republican Senate majorities exceeded 60 percent in 16 sessions. Republicans were reduced to less than 40 percent of the Senate only once before 1959, while Democrats held less than 40 percent in 12 sessions and less than 30 percent of the Senate seats in 7 other sessions.

Most of the time at least one House of the Montana Legislative Assembly has been controlled by the party in opposition to the governor. The governor has had a friendly majority in both houses during only 13 sessions, while he has faced a hostile majority in one house during 15 sessions and in both houses during 11 sessions. This accounts for 39 sessions, including the 40th which will convene in January 1967. The so-called First Legislative Assembly never convened because of inability to resolve a dispute over which slate of candidates would be seated in the House from Silver Bow County.

Analysis of the November 1966 Election

A comparison of legislative election results in November 1966 with those of 1964 might have rather limited value for determining the effects of reapportionment in the latter year for at least two reasons. There may be reasonable doubts whether either election was a "typical" one—whatever that might mean. And the fact that numerous counties were combined to make new legislative districts complicates problems of comparison. What was the effect, if any, of increasing the number of seats in the more populous counties?

This study starts with the assumption that an average of voting performance for several different offices, over a period of several elections, computed for each county into a single index or percentage of party preference (PPI), furnishes a better basis for comparison of results in any particular election than comparison of that election with another single election. Such an index is available, computed for each county from its votes for president, governor, U. S. senator and representative, and state senator and representatives in the six general elections of the inclusive decade 1952-1962.

New indices were computed for multiple-county districts

created by reapportionment in this manner: instead of using actual votes cast in 1964, each county's 1964 *total of registered voters* was assigned between the two parties according to the county's party preference index in six prior elections. These assigned votes then were totalled for the district, and a district index computed from the assigned totals of Republican and Democratic votes.

These county or district Party Preference Indices (PPI) were then used to attribute the legislative seats to a probable party in each of the new districts. Where there was a change from the number of seats held in 1965, the gain or loss was assigned to the party with a favorable PPI in the district, as an effect of reapportionment. It was assumed that in Democratic districts, Democrats would gain or lose seats added or lost by reapportionment. It was further assumed that where counties were combined, the party preferred by the whole district would sweep that district as a consequence of reapportionment. For example, if a small Democratic county was combined with a larger Republican county, Republicans would presumably elect all legislators from the district.

Several words of caution and reservation about the analysis that follows are in order. It is an exercise in political analysis, based upon the single factor of voter preference averaged for six prior elections. Experience and incumbency were ignored in the initial projections, although the writer knows that these frequently transcend generalized party preference.

The six-election PPI "smooths out" short-range trends, but accentuates any long-range trend which may have run during the period measured. There probably was a mildly Democratic emphasis in the PPI indices, attributable to the almost unprecedented Democratic strength in the Montana Senate during 1952-1962. Moreover, it was not known how strong a partisan preference must be to have predictive value. In the following analysis, preference of less than 55 percent for one party was regarded as lacking real predictive value. Conversely, it would appear that preference indices of 60 percent or more may have substantial predictive value.

One more word: this analysis is not an attempt to say who *should* have been elected, either locally or statewide. It is not really even an attempt to predict who *would* get elected. It is an effort to isolate the influence of reapportionment, and it is a first experiment, a "trial run" based upon limited available data. It is also an invitation to others to share in the exercise, and to give the writer the benefit of their views.

The House of Representatives

1. Districts Unchanged by Reapportionment

Any assertion about the influence of reapportionment rests upon some assumption about what would have happened without reapportionment. So analysis can start with what happened in 1966 in house districts which were not changed by reapportionment. There were 13 counties in this group, with an unchanged total of 17 seats. With their new district numbers, and number of seats, they were as follows:

District	County	Seats	District	County	Seats
5a	Sheridan	1	20b	Pondera	1
7	Custer	2	20c	Teton	1
10a	Phillips	1	22a	Powell	1
10b	Blaine	1	24a	Beaverhead	1
11	Fergus	2	24b	Madison	1
14	Park	2	28	Lake	2
20a	Toole	1			

In 1965, Democrats held 9 of the 17 seats, but retained only three of them in 1966. This represented a gain of six seats by Republicans in 1966, in house districts unaffected by reapportionment: one seat each in Sheridan, Phillips, Fergus, Toole and Teton Counties and two seats in Park County. A Democrat took one seat away from a Republican in Powell County. Party alignments were unchanged in Custer, Blaine, Pondera, Beaverhead, Madison and Lake Counties.

2. Multiple-County Districts with No Change in Total Seats

In each of eight districts, two or more counties were combined to share two or three seats for the district; but reapportionment made no change in the total number of seats held by the combination of counties. This group of multiple-county districts held 19 seats in 1964, and again in 1966.

Any effect of reapportionment would be limited to districts combining counties of different party preference, in which district-wide voter preferences now would presumably prevail.

With their new district numbers, and number of seats, they were as follows:

District	Counties	Seats
3	Richland and McCone	2
5b	Valley and Daniels	3
8	Big Horn and Powder River	2
13	Carbon and Stillwater	2
17	Chouteau and Judith Basin	2
19	Hill and Liberty	3
22b	Deer Lodge and Granite	3
27	Sanders and Mineral	2

Democrats held 13 of these 19 seats in 1964, and might have expected to retain that number in the reapportioned districts. In actual fact, they elected 12 representatives in 1966, losing to the Republicans one seat held by a Democrat in 1964. The projections and returns for this group of counties follow:

District	Seats	Election Results 1964 R	1964 D	1966 R	1966 D	PPI Forecast R	PPI Forecast D	PPI Forecast: Expected Party Gain or Loss by Reapportionment (nc = no change)
3	2	0	2	1	1	2	0	+1R
5b	3	1	2	1	2	0	3	+1D
8	2	1	1	1	1	2	0	+1R
13	2	2	0	2	0	2	0	nc
17	2	0	2	2	0	0	2	nc
19	3	0	3	0	3	0	3	nc
22b	3	1	2	0	3	0	3	+1D (?)
27	2	0	2	0	2	0	2	nc
	19	5	14	7	12	6	13	+2R +2D

The Democrats held such strongholds as Districts 19 and 27, while Republicans held their position in District 13. In District 3 where the PPI was marginally Republican, an incumbent Democrat survived. Democratic failure to gain the third seat in District 5b might be attributed to a Republican trend rather than reapportionment; and the same factor may explain failure of the Democrats to hold both seats in District 17. District 22b is marginally Democratic and the Democrats picked up the third seat they might have expected to gain in that district. Meanwhile Republicans failed to get the second

seat they might have expected by reapportionment in District 8, despite the strong Republican PPI in that district.

In this group of districts, Republicans made a net gain of two seats which may be attributed to a Republican trend rather than to reapportionment; conversely the Democrats held all but one of the 13 seats they might have expected on the basis of the six-election PPI applied to the reapportioned districts.

3. *Single-County Districts Which Gained Seats by Reapportionment*

Twelve counties containing the state's principal urban centers gained a total of 17 seats by reapportionment; they now claim 60 of the 104 seats in the 1967 House of Representatives. These are the county-districts which benefited by reapportionment; with their new district numbers, and new apportionments, they are:

District	County	Seats	District	County	Seats
2	Dawson	2	23	Silver Bow	7
4	Roosevelt	2	25	Ravalli	2
9	Yellowstone	12	26	Missoula	7
15	Gallatin	4	29	Glacier	2
18	Cascade	11	30	Flathead	5
21	Lewis & Clark	4	31	Lincoln	2

In such single-county districts reapportionment would presumably extend the number of seats held by the party favored by voters of the county.

In notable contrast to the pattern in some states, partisan gains through reapportionment in these more urbanized counties appear to have been unpredictable in pivotal counties, and distributed between the parties by other counties with strong but divergent party preferences. In eight of these 12 districts, accounting for 44 seats in the new House, six-session Party Preference Indices were strong enough to warrant assignment to one party of probable gains due to reapportionment. Performance and expectation in these eight districts are tabulated on page 20.

Democrats may be said to have taken five of the "new" seats they might have expected to gain through reapportionment, in

Districts	Total Seats 1964	Total Seats 1966	Election Results 1964 R	Election Results 1964 D	Election Results 1966 R	Election Results 1966 D	PPI Forecast R	PPI Forecast D	PPI Forecast: Expected Party Gain by Reapportionment
2	1	2	0	1	2	0	0	2	1D
9	9	12	6	3	11	1	12	0	3R
15	3	4	2	1	4	0	4	0	1R
18	9	11	1	8	1	10	0	11	2D
21	3	4	1	2	3	1	4	0	1R
23	5	7	0	5	0	7	0	7	2D
29	1	2	0	1	1	1	0	2	1D
31	1	2	0	1	0	2	0	2	1D
	32	44	10	22	22	22	20	24	+7D +5R

Districts 18, 23 and 31. But they failed to take one "new" seat which they might have expected in each of Districts 2 and 29. Republicans took five of the five "new" seats which they might have expected to gain by reapportionment in Districts 9, 15 and 21.

But Republicans also took six other seats which Democrats had held in 1964 in Districts 2, 9, 15, 21 and 29. In 1964 Democrats had held six seats in Districts 9, 15 and 21 despite their Republican PPI; in 1966 Democrats retained one seat each in Districts 9 and 21. Republican "recapture" of four seats in Districts 9, 15 and 21, and gain of three seats in Districts 2 and 29 (which have Democratic PPI) may be a fair measure of Republican party recovery in 1966, to be compared with Republican gains in Group I where reapportionment was not a factor.

This is more plausible analysis than one which would have the Democrats simply holding their 22 seats in this group while Republicans gained all of the 12 "new" seats created by reapportionment. Such an explanation fails to account for Democratic losses in Districts 2, 9, 15 and 21, and Democratic gains in Districts 18, 23 and 31.

Four of the county-districts which gained seats through reapportionment had such marginal six-election partisan preference that assignment to a party of seats to be gained by reapportionment was most questionable. To play out the game, assignments were made anyway—on the basis of partisan preferences of less than four percent in each district. The results are tabulated at the top of page 21.

The Democrats failed to capture seats they might have ex-

District	Total Seats 1964	Total Seats 1966	Election Results 1964 R	Election Results 1964 D	Election Results 1966 R	Election Results 1966 D	PPI Forecast R	PPI Forecast D	PPI Forecast: Expected Party Gain by Reapportionment
4	1	2	1	0	2	0	0	2	+1D
25	1	2	1	0	1	1	0	2	+1D
26	5	7	1	4	5	2	4	3	+1D, 1R
30	4	5	2	2	5	0	3	2	+1D
	11	16	5	6	13	3	7	9	+4D +1R

pected to gain by reapportionment in Districts 4, 25, and 30. In District 26 Republicans captured both the seats they might have expected to gain by reapportionment, plus two more held by Democrats in 1964. Conversely in that district, if a 51 percent Republican preference is to predict results for a seven-member district, the Democrats might be said to have held two seats contrary to expectation of a Republican sweep.

It might be said that, in District 25, Democrats took one seat they gained through reapportionment, but failed to recapture the other which Republicans had held contrary to a mildly Democratic PPI. But it seems more persuasive simply to say that, in these pivotal counties, Republicans swept the gains through reapportionment in 1966.

4. Multiple-County Districts Which Lost Seats by Reapportionment

There were five House districts which combined two or more counties of smaller population, reducing the total number of seats held by the counties in the district. This group of districts lost a total of seven seats by reapportionment. With the new district numbers, and new apportionments, these districts were as follows:

District	Counties	Seats
1	Carter, Fallon, Wibaux, Prairie	2
6	Rosebud, Treasure, Garfield, Petroleum	2
12a	Musselshell, Golden Valley	1
12b	Wheatland, Sweet Grass	1
16	Jefferson, Broadwater, Meagher	2

Results and projections for this group of five districts follow:

Districts	Total Seats 1964	Total Seats 1966	Election Results 1964 R	Election Results 1964 D	Election Results 1966 R	Election Results 1966 D	PPI Forecast R	PPI Forecast D	PPI Forecast: Expected Party Loss by Reapportionment
1	4	2	2	2	2	0	2	0	–2R
6	4	2	3	1	2	0	2	0	–2 (R or D?)
12a	2	1	1	1	1	0	1	0	–1D
12b	2	1	2	0	1	0	1	0	–1R
16	3	2	2	1	2	0	0	2	–1R
	15	8	10	5	8	0	6	2	–4 to –6R –1 to –3D

Within this group of districts, PPI suggested loss of four seats by Republicans, but they lost only two in November 1966. Democrats who should have expected to lose three seats by reapportionment actually lost five. In District 1 Republicans might be said to have lost two seats by reapportionment, but to have retrieved the two remaining seats by ousting Democrats who held them in 1964 contrary to the six-election Republican PPI in that district. In marginal District 6, each party may be said to have lost a seat by reapportionment. In District 12a Democrats lost the seat they might have expected to lose by reapportionment, while the Republicans lost the seat they might have expected to lose by reapportionment in District 12b. In District 16 Republicans lost one seat by reapportionment while Democrats lost two which they might have expected to hold because of six-election Democrat PPI. Conversely, in this district with a Democratic PPI of 55 percent, Democrats might attribute their loss to reapportionment if they supposed that Republicans captured the other two seats which Democrats should have held on the basis of Democratic PPI of the district.

Summary of House Analysis

By Party Prefernce Indices, Democrats would have held 50 House seats in 1964, and 56 in 1966; while Republicans would have held 44 seats in 1964, and 48 in 1966. In other words the two parties would have shared the additional 10 seats created by reapportionment, in close proportion to their 1964 strength.

In fact, Democrats had 56 seats and Republicans 38 in 1964, while Republicans took 64 seats and Democrats 40, in November 1966. The Republican net gain of 26 seats more than reversed PPI projections. Where were these Republican gains made?

Republicans gained six seats in Group 1—counties not affected by the reapportionment of 1965; they now occupy 53 percent of the 17 seats in this group.

Republicans made their most significant gains—a net gain of 20 seats—in the populous single-county districts to which reapportionment gave 17 additional seats. Reapportionment increased the total of this group from 43 seats in 1964 to 60 seats in 1966. The principal effect of reapportionment in populous, multi-member, at-large, county districts seems to be that it increases the seats occupied by the party with a county-wide plurality of voters. The dominant party should expect to sweep the county and take all of the additional seats gained by reapportionment.

Yet in 1964, Democrats occupied 29 of the 43 seats then available in this Group 3—a 67.4 percent majority in the group. PPI projection would have given them 33 of 60 seats in 1966, for 55 percent control of the group.

Republicans reversed the 1964 picture to capture 35 of these 60 seats, a 58.3 percent majority within the group.

In Group 2, counties which were combined into districts but lost no seats, Republicans gained a net of two seats. In Group 4, the least-populous counties which were combined into districts while losing 17 seats, Republicans had a net loss of two seats.

Thus, it appears that the Republican gain of 26 seats in the House was the product of factors other than reapportionment. Indeed a Republican trend in 1966 may have offset what otherwise would have been small Democratic gains in the House attributable to reapportionment.

It happened that Republican capture of 26 seats and control of the House can be explained by what happened in 25 single-county districts in Groups 1 and 3, without reference either to PPI indices or to what happened in 31 counties which were combined into multiple-county districts. No explanation of this fact in this election is offered at this time. Nor do we suggest that the pattern may be repeated in subsequent House elections.

The Senate

1. Districts Unchanged by Reapportionment

Nine single-county Senate districts were undisturbed by reapportionment. These (with district numbers in parentheses) were Dawson (2); Roosevelt (4); Custer (7); Fergus (11); Park (14); Ravalli (25); Lake (28); Glacier (29); and Lincoln (31). Incumbents of 1964 were reelected in all of these districts except Park, where a formerly Democratic senator displaced a Democratic senator; but he made his comeback under the Republican banner so there was one seat gained by Republicans in this group in 1966. The senators elected had served a total of 40 prior sessions in the Montana Legislative Assembly and it seems reasonable to suggest that, for the counties in this group, seniority and incumbency may have prevailed against any trend running in the 1966 election. Four Democrats and five Republicans will sit in the 1967 Senate from Group 1.

2. Multiple-County Districts with No Change in Total Seats

Hill and Liberty Counties were combined by reapportionment into District 19 with two senators. Both seats were held by Democrats in 1964 and were retained by these Democrats who were reelected in 1966. Democratic PPI in this district suggested that no change in party control should have been expected by the combining of the counties.

3. Single-County Districts Which Gained Seats by Reapportionment

Seven populous single-county Senate districts gained a total of 20 seats by reapportionment. Their performance and expectations of gain by reapportionment are shown on page 25.

By six-election PPI, Republicans should have gained seven seats and Democrats should have gained eight Senate seats in this group, while five other new seats were in pivotal counties whose partisan preference was too slight to permit assignment of seats to a probable party with any assurance.

In District 9 and District 15, Republicans picked up six of the additional seats they might have expected; but Demo-

District	County	1964 R	1964 D	1966 R	1966 D	PPI	Seats Gained	PPI Forecast: Expected Party Gain By Reapportionment
9	Yellowstone	1	0	6	0	R64%	5	+5R
15	Gallatin	1	0	2	0	R63%	1	+1R
18	Cascade	0	1	1	5	D64%	5	+5D
21	Lewis & Clark	1	0	1	1	R63%	1	+1R
23	Silver Bow	0	1	0	4	D77%	3	+3D
26	Missoula	0	1	2	2	R51%	3	+2R, +1D (?)
30	Flathead	0	1	2	1	D54%	2	+1D, +1R (?)
		3	4	14	13		20	+7R +8D +5 doubtful

crats captured one seat in District 21 which Republicans might have expected to take. Meanwhile Democrats took the three additional seats they might have expected in District 23; and four of the five additional seats they might have expected in District 18. But in District 18 they lost a fifth seat to a Republican who had served two terms in the House from that district.

So both parties got the total of seats they might have expected to gain from counties of pronounced partisan preference within this group: Republicans got their seven seats, and Democrats their eight seats.

Missoula and Flathead Counties were districts with marginal party preference which gained a total of five new seats. Democrats took one, while Republicans swept four of these doubtful seats. If one is looking for evidence of a Republican tide in 1966, this may be its strongest manifestation in the Senate elections.

For whatever reasons, Republicans gained 11 seats and Democrats 9, of the additional 20 Senate seats "earned" by urban counties through reapportionment.

4. Multiple-County Districts which Lost Seats by Reapportionment

Fourteen districts combined 38 counties of smaller population which lost a total of 21 Senate seats by reapportionment. With the new district numbers, and new apportionments, these districts were as follows:

District	Counties	Seats
1	Carter, Fallon, Wibaux, Prairie	1
3	Richland, McCone	1
5	Valley, Daniels, Sheridan	2
6	Rosebud, Treasure, Garfield, Petroleum	1
8	Big Horn, Powder River	1
10	Phillips, Blaine	1
12	Musselshell, Golden Valley, Wheatland, Sweet Grass	1
13	Carbon, Stillwater	1
16	Jefferson, Broadwater, Meagher	1
17	Chouteau, Judith Basin	1
20	Toole, Pondera, Teton	2
22	Deer Lodge, Powell, Granite	2
24	Beaverhead, Madison	1
27	Sanders, Mineral	1

Performance and forecast of these districts were as follows:

	Election Results						
	1964		1966				PPI Forecast: Expected Party Loss by Reapportionment
District	R	D	R	D	PPI	Seats Lost	
1	2	2	1	0	R58%	3	–3R
3	1	1	0	1	R52%	1	–1D (?)
5	1	2	0	2	D63%	1	–1R (?)
6	3	1	0	1	50/50	3	–2R, –1D (?)
8	1	1	0	1	R65%	1	–1R
10	1	1	1	0	D54%	1	–1D (?)
12	1	3	1	0	R59%	3	–2D, –1R
13	1	1	1	0	R59%	1	–1R
16	2	1	1	0	D54%	2	–1D, –1R (?)
17	0	2	0	1	D66%	1	–1D
20	3	0	0	2	D57%	1	–1D (?)
22	2	1	0	2	D68%	1	–1D (?)
24	2	0	1	0	R71%	1	–1R
27	0	2	0	1	D64%	1	–1D
	20	18	6	11		21	–7R –4D –10 doubtful party

In the 10 districts with significant PPI, 14 seats were lost through reapportionment. Republicans might have expected to lose seven of these, and Democrats four, with three doubtful. Republicans actually lost nine and Democrats five from these counties. Four districts—3, 6, 10, and 16—had such slight six-election PPI that the loss of seven seats from them could not be projected with any certainty for either party. Republicans actually lost five of these seats, and Democrats two.

Summary of Senate Election Analysis

If a "trend" explained the impressive Republican gains in House districts unaffected by reapportionment, incumbency and experience virtually cancelled any such trend in Senate districts unaffected by reapportionment. In Senate groups 1 and 2, with 11 counties and 11 seats, six Democratic incumbents and four Republican incumbents were reelected. All had impressive seniority. Republicans gained one seat in Park County (a former Democrat who said he'd "rather switch than fight"). The result in Groups 1 and 2 reflects the total outcome of Senate elections as accurately as these groups suggested the Republican gains in House elections.

The effects of reapportionment in Senate elections must be sought in the shift of 20 seats by reapportionment from 38 counties in Group 4 to seven populous counties in Group 3. The 56th seat disappeared from Group 4 without being restored elsewhere. What gains and losses did each party expect—and experience—in this shift?

In counties of predictable party preference, Republican gains and losses cancelled—seven each. Democrats made predictable gains of eight seats in Group 3, offset by a predictable and realized loss of four seats in Group 4.

Of doubtful seats to be gained in Group 3, Republicans took four, and Democrats one. Of doubtful seats to be lost in Group 4, Republicans lost seven and Democrats three.

Although a substantial shift of seats and "voting power" was effected between Groups 3 and 4 by reapportionment of the Senate, partisan gains and losses were rather evenly distributed between the two parties; and a sufficient number of Senate seats were in counties with such marginal partisan preference that either party might reasonably expect to take these seats from time to time. Actual results in Missoula and Flathead Counties, along with the minimal change in counties unaffected by reapportionment probably reflect rather accurately the respective weights which should be assigned to reapportionment, partisan preference, and seniority in senatorial elections. None of the factors alone will determine the composition of the Senate, which may be expected to alternate between Democratic and Republican control much as it has in the past.

This assessment of the respective roles of reapportionment and of partisan trend factors in the 1966 election appears to sustain the view expressed by the writer and a colleague two

years ago: that reapportionment would have a less significant impact on party balances in the Montana Legislative Assembly than reasonably strong partisan trends might produce from election to election.[2]

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[2]*Montana Business Quraterly*, Winter 1965, pp. 44, 90-95.

Who Pays the Taxes in Montana?

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The question of who pays the taxes is one of the important considerations in analyzing the tax structure in a state. The distribution of the burden of taxes levied on individuals has considerable importance, especially from the viewpoint of fairness. Thus it is obvious that since tax burdens affect fairness and economic behavior, tax burden distribution is an important factor to be taken into account by policy makers and by the people who have to pay the taxes.

Scope and Method of the Study

This article presents estimates of the average Montana taxes paid by people in various income brackets, and the Montana plus major federal taxes paid by individuals. The taxes are presented as a percentage of income by six arbitrary taxpayer income brackets, because the relationship between taxes and taxpayer income is most frequently the criterion used to measure fairness.

The burden of the taxes on individuals was estimated by aggregating the burdens of each of the major components of our tax structure which were estimated by taxpayer income bracket in recently completed research by the author. The analysis included almost all of our state and local taxes. Because the inheritance tax applies to only a few people in any year, it was excluded from the burden calculations. And a few minor taxes, such as the fee on boats, were omitted to simplify the analysis. Income and property taxes on individuals were assumed to burden those actually paying them. Taxes on particular commodities and the corporate income tax were assumed to be shifted to consumers.

A sample of 5,085 Montana individual income tax returns for 1963 provided the data used to determine the burden distribution of the individual income tax. The property taxes listed as personal deductions on these returns were the source

of data to determine the distribution of property taxation and motor vehicle license fees. The remaining Montana taxes considered apply directly to the sale of commodities or to business firms (for example, the gasoline and cigarette excises and the utility company gross receipts and corporate income taxes). As we mentioned above, these taxes were assumed to be shifted forward to the consumers of the products involved. Under this assumption (for which there is considerable theoretical justification) the burden of the taxes would fall on consumers in proportion to the amount of taxed commodities they purchase. Studies of the average spending behavior of families by the United States Departments of Labor and Agriculture furnished the information on spending for these commodities by people in various income brackets.

The federal taxes included in the study were the personal income tax, the corporate income tax, and excise taxes on gasoline, cigarettes, and alcoholic beverages. The burden distribution of the personal income tax was calculated from statistics published by the Internal Revenue Service. Department of Labor and Department of Agriculture publications provided the data we used to estimate the distribution of the burdens of the corporate income, gasoline, cigarette, and alcoholic beverage taxes described above.

Results and Conclusions

Table 1 shows the estimated burden on individuals of Montana taxes and of Montana plus federal taxes in various income brackets. Montana state and local taxes appear to be regressive in the zero to $3,000 income bracket. This regressivity is due to the burden of consumption-based taxes on individuals with less than $1,000 income. Our taxes are slightly progressive on incomes between $3,000 and $10,000 and slightly regressive on incomes above $10,000.

The combination of Montana plus federal taxes are also regressive on incomes less than $3,000 for the same reason that state and local taxes are regressive at this income level. The combined tax burdens are shown to be progressive on incomes in excess of $3,000. However, at levels of income significantly in excess of $15,000 taxes may be regressive. Whether these burden distributions are good or bad is a value judgment which must be decided by the reader himself.

Table 1 shows the average overall burden of Montana taxes

TABLE 1

INDIVIDUAL BURDEN DISTRIBUTION BY INCOME BRACKET OF MONTANA STATE AND LOCAL TAXES PLUS SELECTED FEDERAL TAXES[1]

Income Bracket	Montana Taxes as a Percentage of Income	Montana Plus Major Federal Taxes[1] as a Percentage of Income
$ 0-$ 3,000	9.7	18.4
3,000- 5,000	5.3	14.9
5,000- 7,500	5.5	16.4
7,500- 10,000	6.3	17.6
10,000- 15,000	6.2	19.9
Over 15,000	5.7	24.5

[1]The federal taxes included are the personal income tax, corporate income tax, and excises on gasoline, cigarettes, and alcoholic beverages. Source: *Montana Tax Study,* Part Six.

on individuals in various income brackets. The burden distribution of taxes by income bracket are important viewpoints from which to analyze taxes. However, the reader should keep in mind that these are not the only viewpoints from which taxes should be considered. For example, tax burdens may also be analyzed with respect to the consumption preferences and occupation of taxpayers. Taxes may particularly favor or discourage certain economic decisions by individuals or businesses. Administrative and/or compliance costs may cause additional problems. These other viewpoints will be discussed in future articles in this series on our Montana taxes.

Meeting Future Revenue Needs in Montana

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Laymen and politicians alike generally agree that the need for revenue to finance public services will continue to expand. A growing, progressive economy, such as the United States economy and most of the state economies, seems to *require* an expanded input of public services. Expanding public services is a prerequisite to the growth and progress of an economy structured along mid-20th century lines. A rapidly growing body of literature on investment in human beings indicates that both the social and the private rate of return on investment in people exceeds the rate of return on non-human capital. In particular, the rates of return on investment in health and education appear to be extremely high. Viewed in this light, public expenditure for these purposes should be considered as productive investments that yield high rates of return rather than mere costs.[1]

Increased needs for public revenue always pose the problem of how the tax system should be structured to provide the revenue. The expenditure of such revenues may be productive from both the individual and the social point of view, but a way must be found to give government the purchasing power needed for expanded public services. This means that the purchasing power of private economic units must decline. But economically rational individuals usually prefer that their own purchasing power remain intact, or at least that the taxes necessary to provide needed public services take relatively less from their purchasing power than from others. Because of this selfish (although rational) nature of man, providing more revenue for public services always boils down to the question of how the burden of taxation ought to be distributed.

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[1]"Why Does College Cost So Much?" *Forbes*, Vol. 17, No. 11, (June 1, 1966), pp. 34-36 + 40, 43.

The criteria for distributing tax burdens usually include such things as "ability to pay" and "benefits received." The first of these involves ethics and value judgments more than it involves economics. There is no way that we can measure the sacrifice that one individual undergoes in paying a dollar in taxes as contrasted to another individual. There has been developed in economics, however, a concept known as "diminishing marginal utility of income." Stated in simple form, this concept says that a dollar in income means more (yields more utility) to a poor man than to a rich man.[2] Or put the other way around, the concept states that a dollar loss in purchasing power causes a poor man to suffer a greater loss in utility than a rich man would suffer from the loss of the same amount of purchasing power.

These propositions cannot be verified in the real world, but observations of social action through the years should indicate that as a group *we believe the propositions to be valid.* From this belief has come the assumption that the ability to pay taxes is related in a positive progressive way to income. Nevertheless, there is little that can be said from a strict economic point of view about how progressive the tax system ought to be. Certainly one can say that the social consensus disapproves of regressive taxation *in principle;* but when one looks at the facts in the real world, the case for progressive taxation is not so strong as it appears to be in principle. Certain provisions in both federal and state income tax systems serve to nullify or dampen the progressivity specified by the rate structure.

And while the "benefits received" theory may have been appropriate for distributing tax burdens at one time, the benefits of public services in a modern society are so diffused that it is impossible in most cases to isolate benefits received by particular individuals or groups.

The ability-to-pay principle is bound up in ethics and value judgments, and economic analysis cannot make much of a quantitative contribution to it. About the most we can say is that democratic social consensus opposes regressive taxation. And if, as suggested above, the benefits-received principle is outmoded, as economists we must look elsewhere for guides in distributing tax burdens.

The collection of taxes from the private sector of the economy has certain impacts that are undesirable from either the

[2]The same concept applied to a particular individual implies that as a man's income increases, the utility added by each successive increment of income declines.

individual or the social point of view. This is true even though the spending of tax revenues on public services more than outweighs the private loss. The economic impacts of tax collection may be categorized as to their effects on the allocation of resources, the distribution of income, and the growth or stability of the economy. An efficient allocation of resources, an equitable distribution of income, economic growth and economic stability seem to be prime objectives of economic policy.[3] A tax system should presumably be structured so as to minimize the ill effects on these goals. If a tax system changes the relative prices of goods and services, consumption patterns will be modified and resources will be allocated in a different manner than people would prefer. Taxes may also alter the pattern of income distribution in a way that is not consistent with the equity norms of society. Or taxes may hamper economic growth and introduce instability into the economic system by operating in a cyclical manner. An "ideal" tax system would be designed in such a way as to minimize such ill effects.

There are three main criteria by which taxes may be levied among individuals or private economic units. Taxes may be levied according to what people own (assets), what people earn (income), or what people spend (consumption).

We can get pretty close agreement that people ought to pay taxes in relation to their economic well-being. At any point in time a person's economic well-being can be measured by the assets or wealth that he owns. This fact probably led to the historical popularity of the property tax for distributing the burden of paying for public services.

In principle, the assignment or burden on the basis of wealth or property is sound.[4] An asset (property) has value because it yields an income stream to its owner. But physical assets (property) no longer serve as an appropriate index of wealth. In the modern world, a large part of man's wealth is in the form of investment in himself as a productive human being.[5] So in a free society (a non-slave society), a large fraction of the wealth of the nation is not considered property. As a consequence, only a part of wealth is subject to property taxation.

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[3]Richard T. Bye, *Social Economy and the Price System,* (New York: The MacMillan Company, 1950).

[4]Kenneth E. Boulding, *Economic Analysis,* rev. ed. (New York: Harper and Brothers), p. 775.

[5]For most people, the income from capital invested in the person far outweighs other income. In 1965 about 71 percent of the national income consisted of wage and salary income.

The income tax of the 20th century represents a means of correcting such deficiencies in property or wealth taxation. Since wealth is not true wealth unless it yields an income stream, we use the stream itself (or income) as a proxy for wealth. This gets us around two problems. First, the income stream is discoverable and measureable even though the parent may be concealed. And second, we avoid the valuation problem.

The third general criterion for levying taxes among individuals is spending or consumption. Consumption as an index of economic well-being is imperfect, to say the least. As a practical matter, it is not easy to determine whether a particular expenditure is for consumption or investment. The Department of Commerce makes such determinations in the national income accounts, but in many cases the distinction is admittedly arbitrary. Furthermore, using consumption as an index of economic well-being carries the implicit assumption that consumption is the supreme objective of individual economic endeavor. Classical economic theory postulates that the goal of the individual (family) as an economic organism is to maximize the utility from a given income. This is often, if erroneously, taken to mean that the individual exhausts his income in pursuit of maximum utility through consumption. Both consumption and savings activities yield utility to the individual. Such elements as power, prestige, and status are certainly products of savings-investment activity, as well as products of consumption activity. In any event, a consumption activity tax (such as a sales tax) at uniform rates results in a heavy burden on those with high propensities to consume relative to those with low propensities to consume. For these reasons, consumption is not an appropriate measure of the relative economic well-being of individuals. Consumption taxes at uniform rates leave out part of the base or source of economic well-being and some individuals pay a higher tax relative to economic well-being than others. And since the propensity to consume in relation to income tends to decline as income rises, consumption taxes are always regressive with respect to income.

Although property tax revenues will continue to be an important part of total Montana tax revenue, and property tax collections will rise with economic growth, we should not consider increasing the property tax as an alternative source for meeting expanding revenue needs in the state of Montana. In fact, the property tax as a source of state revenue should be

abandoned. Statewide property tax levies should be phased out, and property taxation should be left exclusively to local governments.

In recent reports to the Taxation Subcommittee of the Montana Legislative Council, the Taxation Task Force takes the position that the state should rely on existing sources, particularly the personal income tax, for expanded revenue needs over the next few years.[6] From the economic point of view, there is no need to compound the complexity of the Montana tax system by adding new sources. The state of Montana already has twenty-seven separate sources for revenue payable into the state treasury.[7] Within these sources are eight classes of property subject to *ad valorem* taxation, four categories of "gasoline" license taxes, three taxes in lieu of *ad valorem* taxes, thirteen categories of motor vehicle registration taxes, and seven categories of beer licenses and taxes. If we include these variants, the state has forty-five sources of state treasury revenue.

Many of the existing taxes are punitive and/or discriminatory.[8] Others are primarily regulatory in nature, or merely serve as a means of expediting registry of certain property or activity.[9] Some of the license taxes amount to either an unnecessary waste of administrative and compliance effort or they are patently discriminatory.[10] Many license tax and permit sources yield so little revenue that they are hardly worth

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[6] *The Montana Tax Study*, Parts VIII and X.

[7] *Twenty-first Biennial Report of the Montana State Board of Equalization*, (Helena, Montana, 1964), pp. 14-16.

[8] The chain store license tax is a case in point. Most state taxes of this sort were intended to improve the competitive position of local merchants relative to "outsiders." Or put the other way around, the tax was intended to punish the chains for competing with local merchants. Obviously, the tax has not accomplished this objective. The trend towards multi-outlet firms continues unabated and the importance of the single store unit continues to decline.

[9] An example of the former is the carbon black license tax. Examples of the latter are the certificate of number for boats and the gasoline tax refund permit.

[10] The electric energy tax and the telephone license tax appear to be in this category. The firms concerned are subject to rate (price) regulation by the state, and these taxes are allowed as costs in rate-making procedure. Insofar as rates are formulized on costs, these taxes are borne by the patrons of the utility companies. Whether the tax is passed on to patrons or borne by the company, the tax is discriminatory.

the bother of administration and collection.[11] Obviously the state should move away from such complexities in the tax system rather than add complexities to the system. A simple (as contrasted to a complex) tax system certainly makes it easier to achieve the accepted goals of tax structure. The myriad of license taxes in the Montana system makes it virtually impossible to trace through the allocative and distributive effects or the effects on growth and stability.

As stated earlier, the Taxation Task Force recommended that the state should rely primarily on changes in personal income tax provisions for additional revenue. The objectives of the state economy are easier to achieve in this manner, and the personal income tax route is preferable on grounds of efficiency in administration and collection.

Nevertheless, a general sales tax of some sort has been considered a practical—even preferable—alternative by many Montana citizens and by some legislators and public officials. Even though the general sales tax is a second best alternative, pragmatism demands that second best alternatives be considered. It is possible to design a sales tax system that will make this alternative a much better "second best alternative" than most states have been able to achieve.

In the first place, a "general" sales tax should be limited to consumer goods and services.[12] If all consumer goods are taxed at a uniform rate the allocation of resources would be relatively undisturbed. It is not necessary—as a matter of fact it is damaging—to compound the situation by levying sales taxes against producer goods used by businesses. Sales taxes levied on producer goods become costs to producing firms. The extent to which the tax affects the costs and the output of a firm depends on the importance of the taxed good in the production process. The result is that productive resources will be allocated in a manner different than consumer choice would dictate. It was mentioned earlier that the distinction between

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[11]According to the *21st Biennial Report of the Montana State Board of Equalization*, the following sources yielded these revenues in 1964: telegraph license tax, $512; aviation gas permit, $710; gasoline dealers permit, $881; cigarette license, $1,745; express companies tax, $3,765; vermiculite license tax, $7,812. These six sources totaled $15,425 in 1964, and represented less than .02 percent of the "revenues payable into the state treasury."

[12]Hereafter, the term "goods" will be used to denote goods and services.

consumer goods and production goods is sometimes arbitrary.[13] While the definitions used by the Department of Commerce in the national income accounts are not perfect, they do serve as a specific base. The Department specifies about 75 categories of consumption expenditures.[14]

Many so-called "general sales tax" systems levy taxes against goods purchased "at retail." This may be a fairly close approximation to the consumer goods tax specified above. But there are important exceptions. For example, many producer goods used by farmers and ranchers are purchased from retail outlets. Certain other "small businesses" also buy from retail outlets. Equity would require that all such items be exempt from sales taxation.

Such exemptions, however, result in administrative and collection problems, particularly where certain items are consumption goods to an individual and producer goods to a firm. We suggest that all goods and services sold through retail outlets be taxed in the usual manner and that a tax credit under either the individual income tax or the corporation license tax be used to offset the sales tax paid. The test for eligibility of such expenditures for tax credit already exists. Producer goods and services qualify as business expenses in both the federal and Montana tax systems. Firms are now required to justify "business expenses" and any sales taxes paid in connection with such expenses would qualify as a tax credit. In some cases, where the firm and the household are not clearly segregated, certain expenditures would have to be divided between consumption and production—as is already the case with income taxation.

A consumer goods tax without exemptions is superior to one that specifies exemptions. There are several reasons for this position. *First*, a system with exemptions causes uneven changes in the price ratios between goods, and a less desirable allocative pattern results. *Second*, there is always a clamor on the part of special interest groups to gain exemption. *Third*, exemption makes the tax harder to administer. *Fourth*, exemption denudes the tax base. Food and medical expenditures are often excluded from sales taxation, but these categories

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[13]While a workman may consider his overalls to be a producer good, the Department of Commerce and the Internal Revenue Service consider them to be a consumer good.

[14]*Survey of Current Business*, Vol. 45, No. 11, (November, 1965), pp. 20-23.

combined comprise about 36 percent of taxable consumption expenditures. Another common exclusion is the category of services as contrasted to commodities. Services accounted for about 40 percent of total United States consumption in 1964.[15] The exclusion of food, medical care, and services would reduce the tax base by about three-fourths and require a rate four times as great as that needed to provide a given amount of revenue without the exclusions. *Fifth*, excluding certain goods from taxation involves judgments that are hard to defend.

The usual reason for excluding certain categories of goods and services from sales taxation is that "necessities" (for example food and medicine) are required for sustenance. In an affluent society, categorizing such goods as "necessities" is neither very valid nor very meaningful. In most households a television set on the blink or a power failure will cause more distress than a closed grocery store. In any event it is *income* that is necessary and not particular goods; and if the objective is to provide subsistence at some minimum level of health and decency it is more appropriate and more practical to look at income directly. *It is true that any kind of taxation is especially detrimental to the poor.* Those at the "minimum level of health and decency" cannot afford sales taxes or any other kind of taxes. A sales tax system is especially hard on the poor because they spend a high proportion of their income on sustenance. But the poor are not the only consumers of food, clothing, shelter, and medicine. Everyone else consumes these things too, and the well-to-do consume more of these things than do the poor. So in an aggregative sense, exclusions designed to help the poor are more help to those who are not poor.

A tax credit or rebate is superior to specific sales tax exemptions for relieving the plight of the poor. The superiority is clear on either allocative or administrative grounds. Suppose, for example, that it is desirable to provide each person with $600 each year in tax free income as both the federal and the state personal income tax now suggest. Each member of a household would then be entitled to a tax credit equal to $600 multiplied by the sales tax rate. At a two percent rate, the credit would amount to $12 per person. A family of five, for example, would be allowed $60 as an offset against any state income tax liability the family might have. This procedure would eliminate sales tax liability for low income families.

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[15] *Ibid.*

Montana's Revenue Needs

Nearly everyone assumes that each successive session of the Legislative Assembly will be faced with larger budgets than before. How fast will the budgets grow? How fast should appropriations be expanded to meet these requests? The answer to such questions depends basically on the rate of growth of the state economy and upon our willingness to divert resources (income) from private to public use.

It is well known that in some areas of public service Montana is substandard. Since 1951, for example, state expenditure per capita for public welfare has *declined* at an annual rate of 38¢, while the average U. S. per capita expenditure has *increased* at an annual rate of 86¢ (Table 1). Such comparisons are not strictly valid because Montana's welfare problem may not be comparable to that in other states, but the steady decline in Montana's per capita income relative to U. S. per capita income would seem to indicate that Montana is moving in the wrong direction. Montana state government expenditures per capita on health and hospitals averaged $9.03 for 1951-65 compared to $11.27 for the United States. Montana's annual rate

TABLE 1

STATE GOVERNMENT EXPENDITURES PER CAPITA, MONTANA AND UNITED STATES, 1951 TO 1965

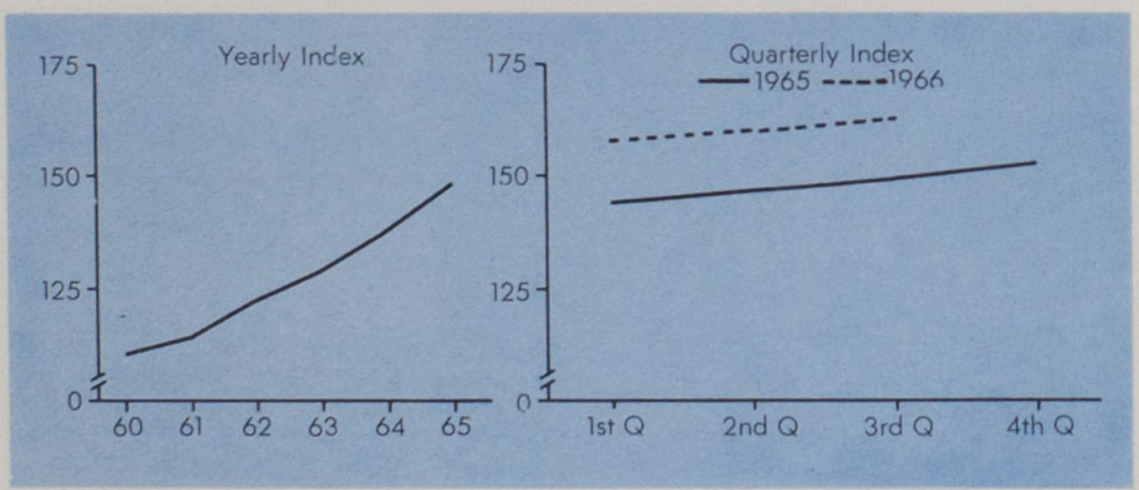
Function	Montana Per Capita Expenditures		United States Per Capita Expenditures	
	Average 1951-65	Average Change Per Year	Average 1951-65	Average Change Per Year
Total expenditure	$211.963	$11.7758	$160.729	$9.9975
Total general expenditure	171.086	10.3016	138.412	8.7887
Public safety	4.389	.2310	3.679	.1962
Public welfare	19.639	–.3842	19.542	.8637
Education	50.373	3.4218	44.942	3.6040
Highways	61.731	5.6700	36.301	2.2442
Health and hospitals	9.027	.1180	11.271	.5167
Natural resources	11.005	.2642	4.830	.2215
Employment security	2.149	.1242	1.641	.0970
General control	4.275	.2280	3.483	.1844
Miscellaneous	8.495	.6286	12.452	.8945
Liquor stores	21.388	–.2878	4.985	.0029
Total insurance trust	18.156	.9592	17.524	1.2054

Source: Based on data from U. S. Bureau of the Census, *Compendium of State Government Finances*, 1951 to 1965.

National Indicators —

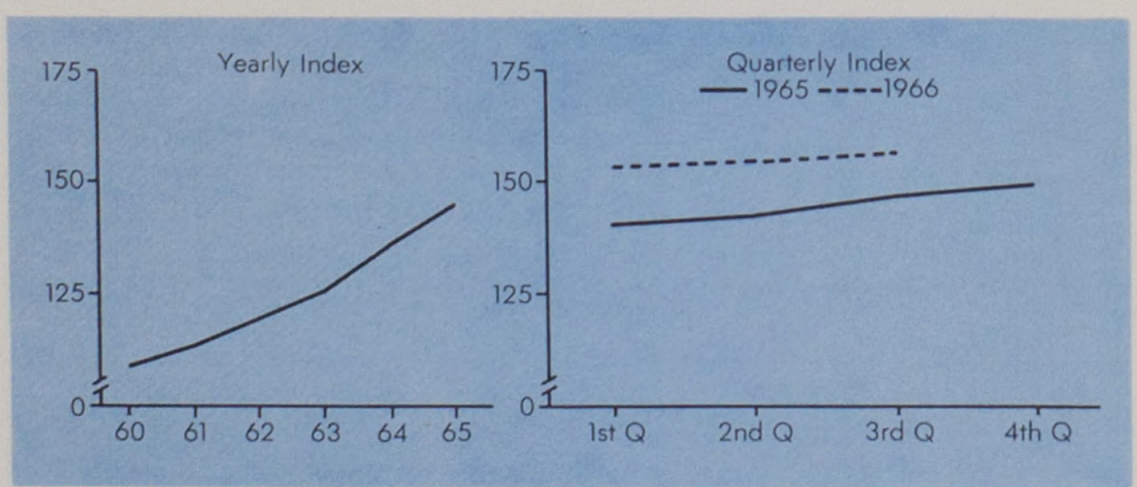
GROSS NATIONAL PRODUCT

1957-59 = 100 — Seasonally adjusted, annual rates



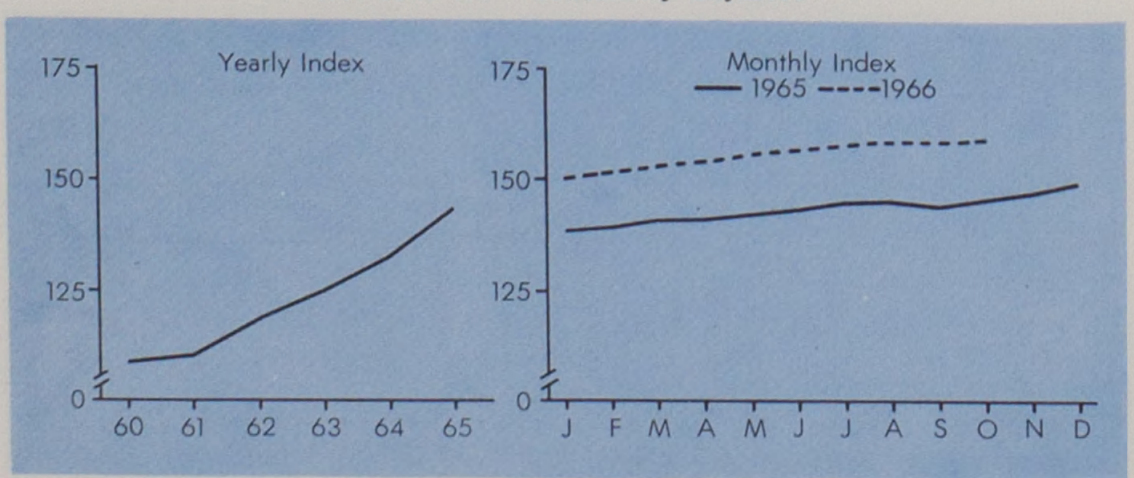
DISPOSABLE PERSONAL INCOME

1957-59 = 100 — Seasonally adjusted, annual rates



INDUSTRIAL PRODUCTION

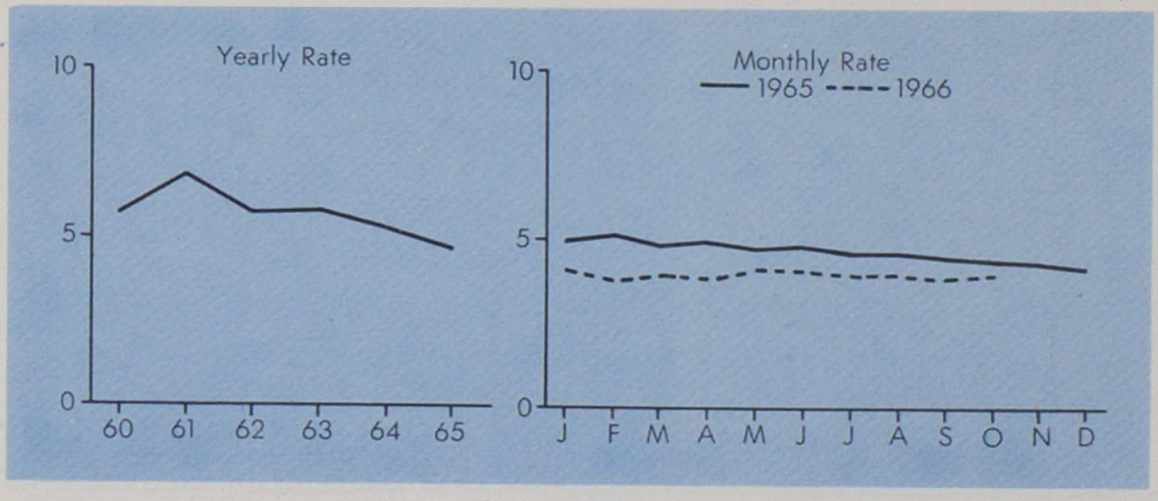
1957-59 = 100 — Seasonally adjusted



National Indicators —

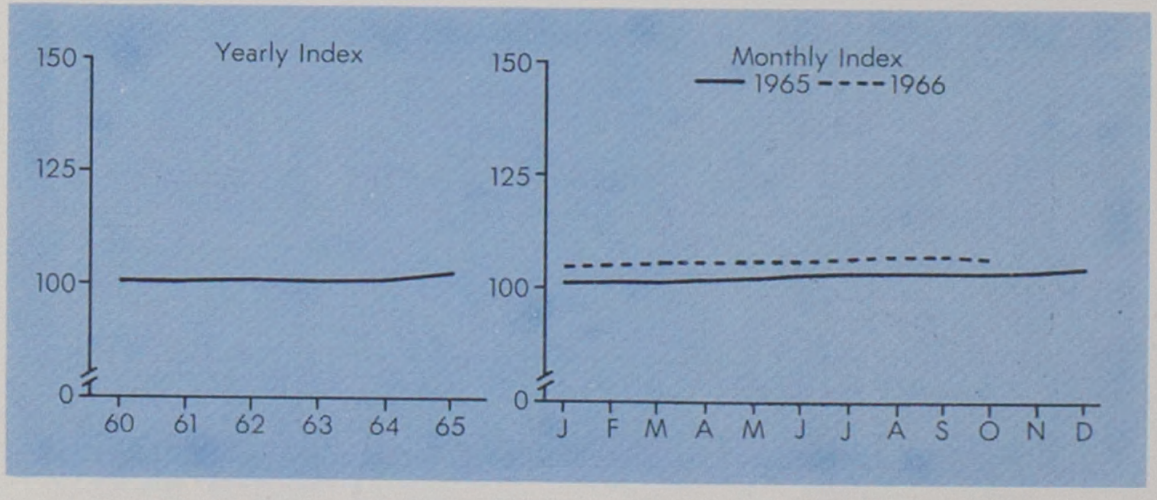
UNEMPLOYMENT AS % OF THE LABOR FORCE

Seasonally adjusted



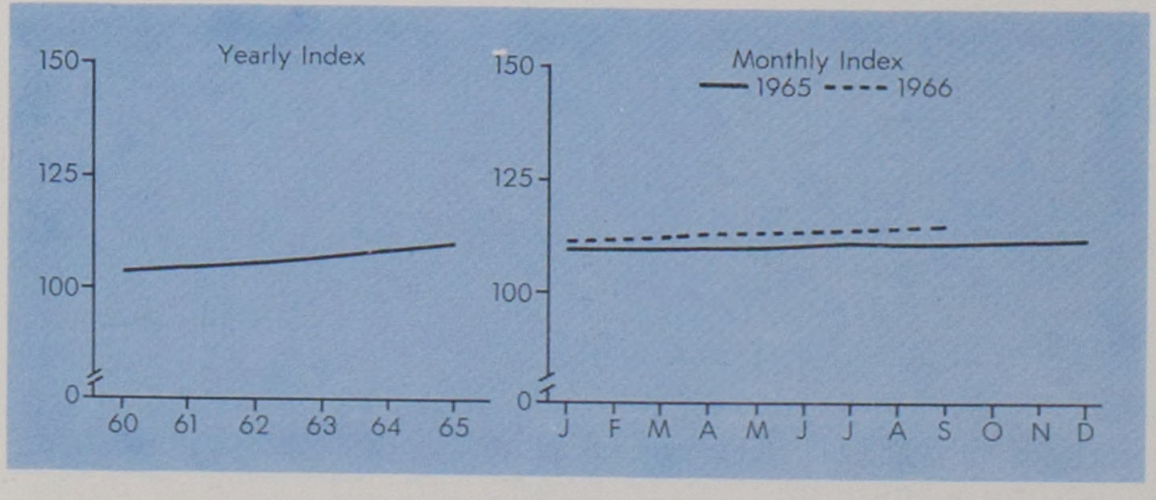
WHOLESALE PRICE INDEX

1957-59 = 100



CONSUMER PRICE INDEX

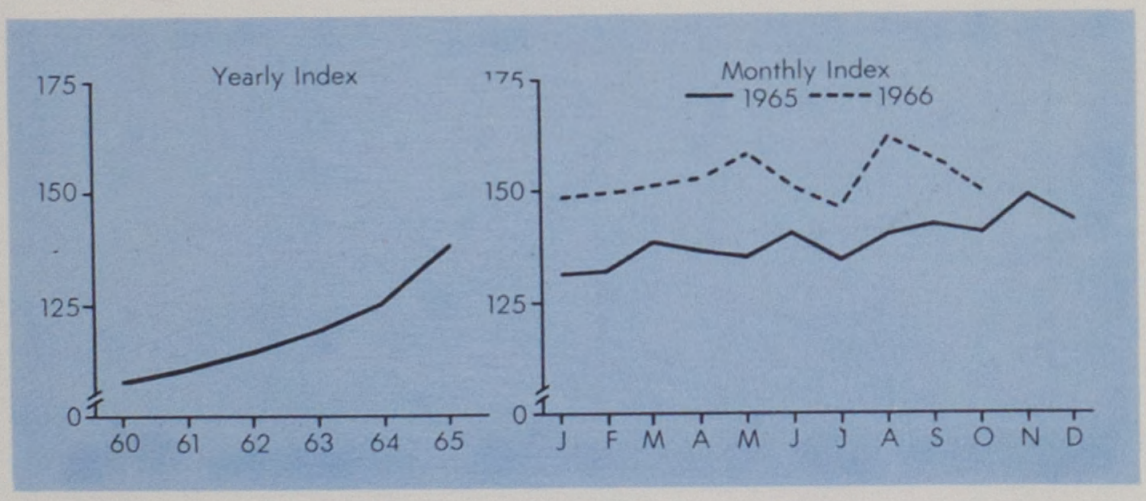
1957-59 = 100



Montana Indicators —

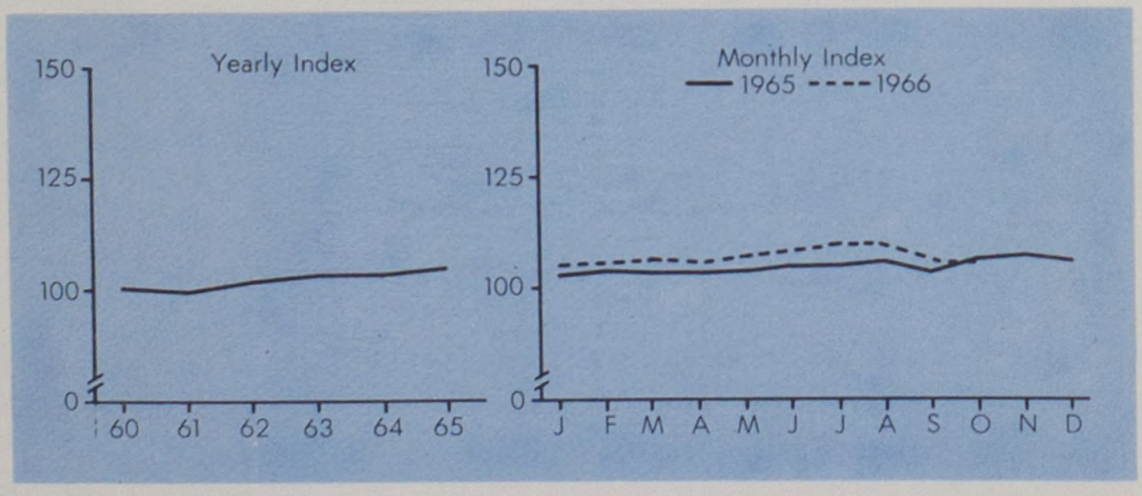
BANK DEBITS

1957-59 = 100 — Seasonally adjusted



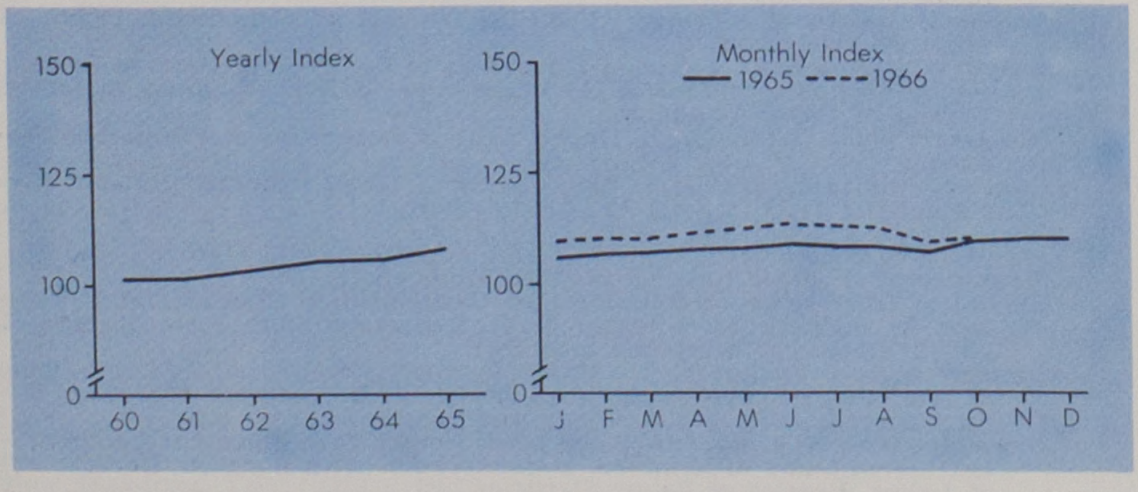
EMPLOYED WORK FORCE

1957-59 = 100 — Seasonally adjusted



NONAGRICULTURAL EMPLOYMENT

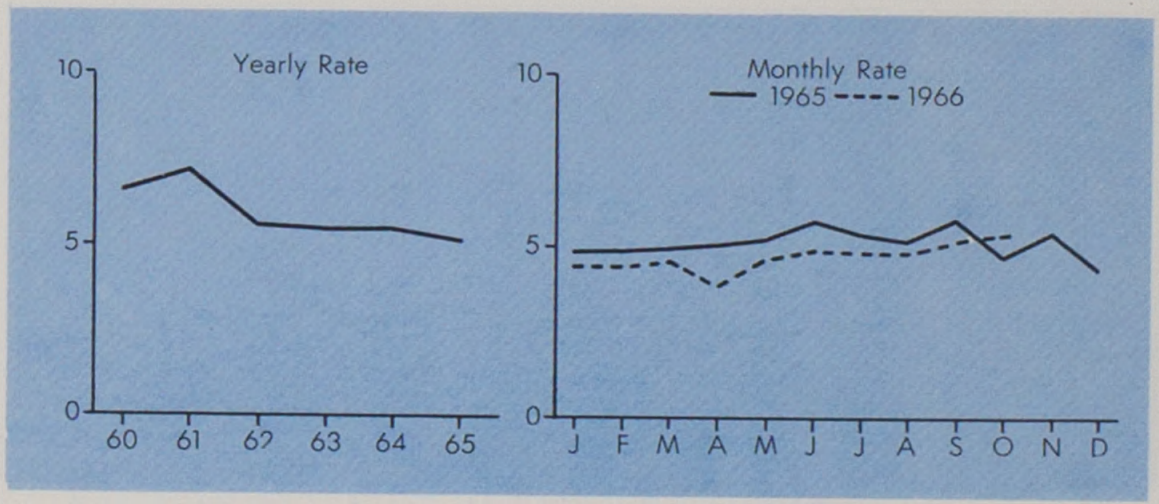
1957-59 = 100 — Seasonally adjusted



Montana Indicators —

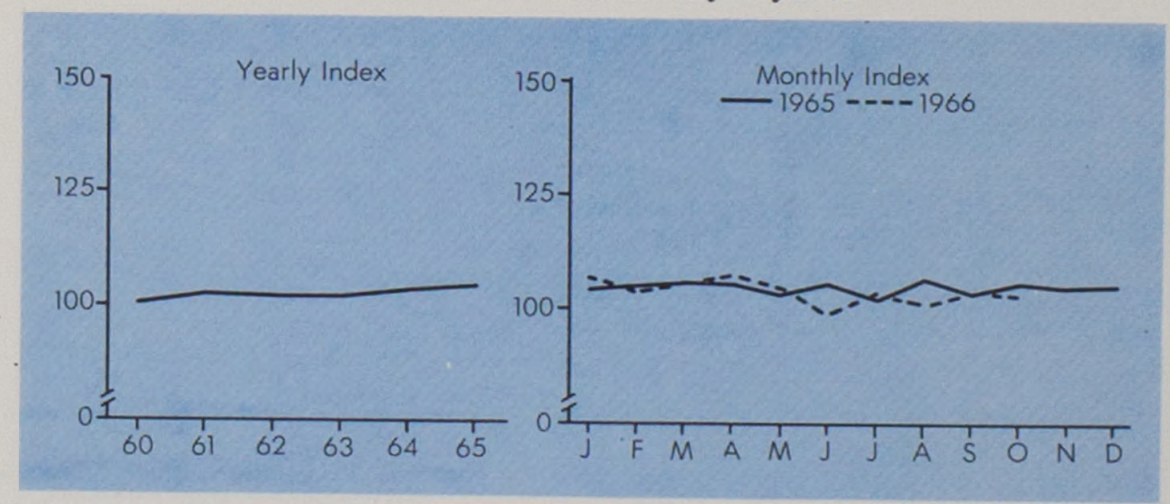
UNEMPLOYMENT AS % OF THE LABOR FORCE

Seasonally adjusted



AVERAGE WEEKLY HOURS, MANUFACTURING

1957-59 = 100 — Seasonally adjusted



SOURCES OF DATA

National Indicators

Gross national product: U. S. Department of Commerce, Office of Business Economics.

Disposable personal income: U. S. Department of Commerce, Office of Business Economics.

Industrial production: Board of Governors of the Federal Reserve System.

Unemployment as a percent of the labor force: U. S. Department of Labor, Bureau of Labor Statistics.

Wholesale price index: U. S. Department of Labor, Bureau of Labor Statistics.

Consumer price index: U. S. Department of Labor, Bureau of Labor Statistics.

Montana Indicators

Bank debits: Federal Reserve Bank of Minneapolis.

Employed work force: Unemployment Compensation Commission of Montana, in cooperation with the U. S. Department of Labor, Bureau of Labor Statistics. Excludes military.

Nonagricultural employment: Unemployment Compensation Commission of Montana, in cooperation with the U. S. Department of Labor, Bureau of Labor Statistics. Wage and salary workers only.

Unemployment as a percent of the labor force: Unemployment Compensation Commission of Montana, in cooperation with the U. S. Department of Labor, Bureau of Labor Statistics.

Average weekly hours in manufacturing industries: Unemployment Compensation Commission of Montana in cooperation with the U. S. Department of Labor, Bureau of Labor Statistics.

of change in this expenditure was about 12¢ compared to 52¢ for the United States.

Montana's capital outlay for correction institutions averaged 41¢ per capita for the period 1951-65, and *declined* at a rate of about a cent per capita during the period. Average U. S. expenditures for the same period were 38¢ per capita, but the U.S. expenditure *increased* at a rate of two cents per capita (Table

TABLE 2

STATE GOVERNMENT CAPITAL OUTLAY EXPENDITURES PER CAPITA BY SELECTED FUNCTIONS, MONTANA AND THE UNITED STATES AVERAGE, 1951 TO 1965

	Capital Outlay Per Capita[1]			
	Montana		United States	
Function	Average 1951-65	Average Change Per Year	Average 1951-65	Average Change Per Year
All education	$7.04	$ .37	$4.08	$ .42
Hospitals	1.15	–.15	1.32	–.04
Correction	.41	–.01	.38	.02
Public buildings	.42	.02	.32	.03
Higher education	6.17	.40	3.52	.38

[1]Includes expenditures for construction, equipment, land and alterations for fixed structures.

Source: U. S. Bureau of the Census, *Compendium of State Government Finances*, 1951 to 1965.

2). Montana's general government expenditures per capita, excluding highway expenditures averaged $72.51 for the 1951-65 period and increased at a rate of $4.65 per year. The comparable figures for the United States were an average of $49.67 and an annual increase of $6.54. So while Montana per capita general expenditures exceeded the U. S. average for most of the 1951-65 period, Montana fell behind after 1962.

Dr. William Diehl, Research Director for the Montana State Board of Equalization, has projected Montana's revenue and expenditures through the fiscal year ending June 30, 1970.[16] The expenditure projections made by Dr. Diehl were not intended to reflect Montana's basic need for public services. Rather, they were intended to project the historical response of the legislature to budget requests during the 1951-65 period.

Diehl's projections for both revenue and expenditures were based on the relationship of Montana per capita income to United States per capita income and upon alternative rates of

[16]*The Montana Tax Study*, Part V.

growth in United States income per capita.[17] The expenditure projections make use of what statisticians call "linear regression." This procedure involves "arithmetic progression," as contrasted to "geometric progression." This is not to say, however, that the state's *needs* for public services change in a linear fashion through time.[18]

There is some evidence that needs for public services change in a geometric fashion. If one looks to budget requests rather than appropriations as an index of needs, it appears that needs over the past few years have followed the geometric route more closely than the arithmetic route. Dr. Diehl has analyzed state expenditures for higher education and found that if appropriations for higher education continue to change in a linear fashion as they have in the past, expenditures per student will decline from now to 1971. The basic reason for this decline is that enrollment is increasing more rapidly than total expenditures (Table 3).

TABLE 3

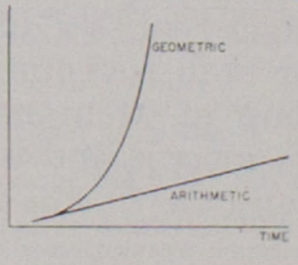
MONTANA UNIVERSITY SYSTEM: PROJECTED TOTAL EXPENDITURES, ENROLLMENT AND EXPENDITURE PER ENROLLEE, 1966 TO 1971

Year	Total Expenditure	Enrollment	Expenditure Per Enrollee
1966	$30,660,000	18,183	$1,686
1967	32,551,000	19,705	1,652
1968	34,907,000	21,226	1,645
1969	36,926,000	22,747	1,623
1970	39,329,000	24,270	1,620
1971	41,312,000	25,769	1,603

The estimates that follow in this report are based on the assumption that Montana's needs for public services as reflected in expenditure requirements follow a geometric pattern up to 1971.

[17] *Ibid.*, pp. 2-5.

[18] Example of "arithmetic" and "geometric" progression.



projections similar to those reported by Dr. Diehl have been made for state expenditure needs for the 1968-1971 period. The estimating procedure is the same except that the data were put in logarithmetic form. The results of these projections for total expenditure needs by years appear in Table 4.

TABLE 4

ESTIMATES OF MONTANA'S TOTAL EXPENDITURE NEEDS AND PROJECTED TOTAL REVENUE FOR FISCAL YEARS 1968 THROUGH 1971

(millions of dollars)

Fiscal Year	Expenditure Needs	Revenue Projections[1]	Difference (Rev. minus Exp.)
1968	290.2	273.8	–16.4
1969	317.5	291.6	–25.9
1970	346.6	310.2	–36.4
1971	377.9	330.0	–47.9

[1]The revenue projections are adjusted to conform to the suggestion of the Taxation Task Force that the University System levy and the statewide two mill levy be eliminated. The adjustments were as follows: 1968, $6.7 million; 1969, $7.1 million; 1970, $7.5 million; 1971, $8.0 million.

The needs estimates presented in Table 4 are tied to an assumed rate of growth of five percent for the United States economy.[19] The annual rate of growth in U. S. personal income has exceeded five percent during 1964-66.[20] The Viet Nam War and the economic forces associated with it should lead us to expect a U. S. income growth rate of at least five percent so long as these forces are present. If, as seems likely, the unsettled conditions in Southeast Asia continue for an extended period of time, it seems reasonable that we should base our state fiscal policy for the next two biennia on an assumed U. S. income growth rate of five percent or more.

If U. S. per capita incomes continue to rise at a rate in excess of five percent as they have since 1964, the State of Montana should have total revenue of about $565 million in 1968-69 and $640 million in 1970-71. These are the revenues we should ex-

[19]*Op. cit., Montana Tax Study,* pp. 2-5.

[20]*The Montana Tax Study,* Part V, Table 1. U. S. per capita income in 1964 was 5 percent above 1963; the figure for 1965 exceeded the 1964 figure by 5.8 percent; per capita income in 1966 is running ahead of 1965 by more than 6 percent.

pect even with no significant changes in revenue sources or rates.[21]

The analysis used in this report indicates that the state will need to raise about $127 million more revenue over the next two biennia than current sources and tax rates will provide[22] (Table 4). Most of this will have to come through taxes, and either rate revisions or new sources will have to provide an average of about $32 million per year over the next four years.

What are the alternatives? At the beginning of this paper, we discussed the general attributes of three alternatives. As stated earlier, the Taxation Task Force rejects the property tax as a practical and desirable alternative. The Taxation Task Force has expressed a rather strong preference for the personal income tax route over the sales tax route. Nevertheless, the changes in the personal income tax and the sales tax rates that would be required to meet the estimated needs, are presented.

Estimates of the revenue yield of certain changes in the provisions of the personal income tax law appear in Part X of *The*

TABLE 5

ESTIMATED REVENUE YIELD OF SELECTED CHANGES IN MONTANA'S PERSONAL INCOME TAX PROVISIONS FOR FISCAL YEARS 1968-1971[1]

(millions of dollars)

Fiscal Year	Eliminating All Deductions	Substituting $6.60 Tax Credit for $600 Exemptions	Eliminating Separate Filing Provision	Total
1968	18.8	12.2	4.6	35.6
1969	19.7	12.8	4.8	37.2
1970	20.7	13.4	5.0	39.1
1971	22.0	14.1	5.3	41.4

[1]These estimates are based on calculations made by Dr. John Wicks in connection with Part VI of *The Montana Tax Study.*

[21]The components of "total revenue" are tax revenue, intergovernmental revenue (transfers from federal and local to state), revenue from charges and miscellaneous sources, liquor store revenue and revenue from insurance and trust systems. See Part V, Tables 6, 9, 11, 13 and 15 of *The Montana Tax Study* for the projected components. The specific assumption involved here is that modifications conform in general to the 1951-65 pattern of modifications.

[22]These estimates take account of the recommendations of the Taxation Task Force that the University System levy and the state-wide two mill levy be eliminated.

TABLE 6

ESTIMATED YIELD OF A MONTANA GENERAL SALES TAX ON CONSUMPTION GOODS AND SERVICES AT ALTERNATIVE TAX RATES FOR FISCAL YEARS 1968 TO 1971

Fiscal Year	Estimated Yield in Millions of Dollars at Rate of:[1]				
	1.5%	2.0%	2.5%	3.0%	4.0%
1968	16.2	21.6	27.0	32.4	43.2
1969	16.6	22.2	27.7	33.3	44.4
1970	17.0	22.6	28.3	33.9	45.2
1971	17.3	23.0	28.8	34.5	46.0

[1]Estimates are based on consumption data in *Survey of Current Business*, (November 1965), pp. 20-23. It is assumed that the ratio of consumption to personal income is the same for Montana as for the United States. The following are excluded from "total" consumption: food furnished employees without charge, clothing furnished to military personnel, residential housing, services furnished without charge, private education and research, and religious and welfare activities.

Montana Tax Study. These estimates were based on existing tax rates and on 1965 levels of personal income. In Table 5, these estimates have been expanded at an annual rate of five percent to obtain estimates for the years 1968 through 1971.

Estimates of the yield of a "general sales tax" to the State of Montana are presented in Table 6. These estimates conform to the specifications set forth earlier in this paper.

The revenue projections and estimated expenditure needs discussed earlier, along with the estimated shortage for fiscal years 1968 through 1971, appear in Table 4.

The estimated revenue gaps for the next four fiscal years, and the income tax changes and sales tax rates required to fill the gaps are presented in Table 7. According to these estimates, all of the income tax changes presented in Table 5, *or* a sales tax rate of about 4.15 percent would be required to fill the revenue gap in 1971. The steps of changes in income tax provisions or changes in sales tax rates necessary to adjust gradually to 1971 are also presented in Table 7.

This report has important implications for the people of Montana, their representatives in the Legislative Assembly, and their leaders in the administrative branch of the state government. All too often in the past we have asked ourselves: "How little can we get by with in allocating funds for public services?" The attitude in handling the University System budget for 1968-69, for example, seemed to be one of minimizing expenditures without disrupting the operation of the System. Instead of acting as if we want to minimize expendi-

TABLE 7

Fiscal Year	Revenue Gap	Approximate Income Tax Changes and Sales Tax Rates Required to Fill the Revenue Gap
1968	$16.4 Mil.	A. Eliminating all deductions (Col. 1, Table 5) **OR** B. Substituting tax credit for exemptions *plus* elimination of separate filing provision (Cols. 2 & 3, Table 5) **OR** C. Sales tax rate of about 1½%
1969	$25.9 Mil.	A. Eliminating all deductions *plus* eliminating separate filing provision (Cols. 2 & 3, Table 5) **OR** B. Sales tax rate of about 2⅓% (Table 6)
1970	$36.4 Mil.	A. Eliminating all deductions *plus* substituting tax credit for exemptions **OR** B. Sales tax rate of about 3¼% (Table 6)
1971	$47.9 Mil.	A. All of the provisions in Table 5 *plus* a change in income tax rates of about 15% **OR** B. Sales tax rate of about 4% (Table 6)

tures for certain public services, we ought to be asking how we can gauge expenditures so as to reap the optimum return to the public and private sectors of the state economy.

The rate of growth in the Montana economy has been relatively low over the past twenty years or so. On a per capita basis we are becoming poorer in relation to the average U. S. citizen. Under these circumstances we are inclined to think we can afford to spend relatively less for public services. This attitude puts things the wrong way around. One of the reasons for the relatively low rate of Montana growth is that the state is moving away from an agrarian (rural) complex without investing the necessary capital required to facilitate the change. Investment in Montana people, particularly the youth of the state, can serve as an offset against the shortage of physical

capital. Investment in Montana people, particularly in the form of education and health, will make us richer, not poorer.

Many, perhaps most, of the state revenue changes over the years have been hit-and-miss type changes designed to get us over the hump for the "next two years." Now is the time to take a longer-run view and look at the prospective needs and the revenue changes required to meet these needs. This report presents a needs-revenue view through 1971. This is not an adequate view into the future, but it gives us a start. This report and other reports growing out of *The Montana Tax Study* provide a foundation for planning for public service needs in the future. If the policy-making bodies of the state do not build on this foundation, the time, money and effort that have gone into the study will have been largely wasted.

The Case for the Montana Tax Study Recommendations

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Senate Joint Resolution No. 9 of the 1965 Montana Legislature requested the Montana Legislative Council to make a study of Montana's taxes with the assistance of personnel from the University of Montana, Montana State University, and the State Board of Equalization. Two economists from each of these units plus an officer of the Federal Reserve Bank of Minneapolis were selected to constitute a Task Force to conduct the actual research in this tax study. This Task Force recently completed its work and made several recommendations for significant changes in our state's tax structure. This paper explains these recommendations and presents an evaluation of them by the author, who was a member of this Task Force.

Provision for Additional Revenue Needs

The primary recommendation of this group concerned the revenue source to finance present and future needs for additional tax revenue by the state government. The members of the Task Force recommend that the individual income tax be used to finance Montana's expanded revenue needs. We recommended this tax source for two basic reasons: (1) The individual income tax has significant advantages when compared to the primary alternative, the adoption of a general retail sales tax; and (2) changes in the income tax which would raise considerable sums of additional revenue would also improve the tax from the viewpoints of equity and collection efficiency.

One of the strongest advantages of expanding income taxation, as compared with enacting a sales tax, involves basic efficiency in government. The administration of a sales tax would necessitate the creation of a new state government bureau. Furthermore the costs to business firms of keeping the

additional records necessary for sales tax purposes, collecting the taxes, and submitting them to Helena—these costs are known as compliance costs—would be considerable. The combined administrative plus compliance costs would probably be six to eight percent of tax collections. In the year the tax was enacted, they would undoubtedly be higher than that, due to the expense of creating a new government agency. On the other hand, it is possible to collect additional revenue from an *existing* tax source, such as the income tax, without creating any additional administrative or compliance costs. In fact, the recommended changes to the income tax would lower, rather than raise, the compliance and administrative costs for the income tax.

Another very important viewpoint from which to compare tax methods is the distribution of their burden—that is, who ultimately pays the tax. Many people seem to feel that taxes should be progressive—that is, a person's tax liability as a percentage of his income should rise as his income goes up. However, even if we agree with the value judgment that taxation should be progressive, the question of *how* progressive still remains. This question is one which must be answered by the Legislature. The advantage of an income tax with respect to the burden distribution question is its flexibility. By varying the rates and the specific items included in the income tax base, it is possible for a legislature to obtain the tax burden distribution which it desires—whether proportionate, somewhat progressive, or very progressive. However, the sales tax allows no such flexibility in burden distribution. A sales tax on all retail purchases tends to be regressive, because people with high incomes generally spend a lesser percentage of their income than lower income people do. By the use of a tax credit provision—a flat amount of tax refund per person—or by other means it is possible to eliminate much of this regressivity, but most other burden distribution alternatives are unavailable to legislators. However, even a proportionate tax burden could be obtained at least as readily with an income tax.

In view of these considerations, the Task Force feels that the sales tax is a second-best way to obtain additional revenue. In comparison, changing our income tax to obtain additional revenue saves on administrative and compliance costs, and offers great flexibility in providing the desired distribution of tax burden. In addition, the Task Force's specific recommendations for changes in the income tax would improve the efficiency and fairness of that tax, as discussed below.

Recommended Income Tax Changes

The most far-reaching recommendation of the Task Force with respect to Montana's income tax calls for the elimination of so-called personal deductions. The present law allows a taxpayer to deduct certain expenditures—for example, contributions, interest paid, and federal income taxes paid from the tax base; the Task Force recommends that these deductions no longer be allowed. (These deductions should in no way be confused with business expenses, which would continue to be fully allowed as deductions.) The ostensible purpose of personal deductions is to allow exclusion from taxation of items which do not provide economic ability for the taxpayer. But the effectiveness of personal deductions in fulfilling this goal is open to serious question. For example, contributions and income taxes paid do represent the economic ability of taxpayers; and interest paid (on loans or mortgages, for instance) represents an expenditure for services—the enjoyment of consumption now rather than in the future—the same as other expenditures for services. Some taxpayers are in a much better position than others to take advantage of the provision for personal deductions in order to reduce their tax liability. As a result, some taxpayers pay much more Montana income tax than others with virtually the same amount of income. The average amount by which deductions vary among taxpayers with incomes between $7,500 and $10,000 is approximately 34 percent; for taxpayers at most income levels, the average amount of variation exceeds 40 percent. We have concluded that the provision for personal deductions creates considerable inequity among taxpayers with similar incomes.

Furthermore, the provision for personal deductions adds considerably to the administrative difficulties and compliance costs of personal income taxation. These deductible items constitute a considerable portion of the auditing problems for the State Board of Equalization and of the record keeping costs for individual taxpayers. Research done in connection with the Tax Study estimates that the combined administrative plus compliance costs of the Montana individual income tax exceed twenty percent of tax collections. A cost this high represents a considerable use of resources. A reduction of this cost would improve the tax from the viewpoints of both fairness and the absence of undesirable effects on the economic system.

The second income tax recommendation concerns the tax-free allowance granted to the taxpayer for himself and each

of his dependents. This allowance is currently provided in the form of a subtraction of $600 from taxable income per dependent. The purpose of this personal exemption is undoubtedly to allow a certain minimum standard of living (or portion thereof) tax-free—that is, to provide some relief from the payment of taxes for those with low incomes. However, the $600 personal exemption is worth a great deal more to a high income taxpayer than to one with low income. Each exemption saves a person in the top tax bracket $47.40 in tax liability (the 7.9 percent tax rate times $600) while an exemption is worth only $6.60 in tax saved for a person with less than $1,000 of taxable income (1.1 percent times $600). Clearly, the personal exemption is helping rich taxpayers more than the poor. The Task Force recommends that a $6.60 tax credit for the taxpayer and each of his dependents be substituted for the present $600 personal exemption. (A tax credit is a dollar amount which the taxpayer may subtract directly from his income tax liability. The $6.60 figure was obtained by multiplying the bottom tax rate, 1.1 percent, by $600). This recommendation would provide the same tax reduction for each dependent, regardless of the taxpayer's income.

The third recommendation of the Task Force with respect to the income tax is made to increase administrative efficiency. At present, if a married person and his spouse both earn income, each may file a separate Montana tax return in order to minimize his or her tax liability. In comparison with the filing of joint returns by married couples, this procedure obviously doubles the number of returns and necessitates the arbitrary apportionment of many personal exemption items between husband and wife. The auditing of such division is extremely difficult. To eliminate these administrative and compliance problems, the Task Force recommends that married couples be required to file joint tax returns.

Based on the assumption that the 1965 level of income in the state will prevail in the future, elimination of personal deductions would yield an estimated additional tax revenue of $16.2 million per year; the substitution of the $6.60 tax credit for the $600 personal exemption would yield about $10.5 million; and the requirement of joint returns for married couples would bring in roughly $3.0 million a year. (For the fiscal year ending June 30, 1966, the state income tax yielded $21.5 million.) Since future increases in personal income in the state are likely, the revenues expected from the changes are likely to exceed these estimates. And these estimates are

calculated on the assumption that each of the changes is made independently of the adoption of any of the other changes. If they were all made simultaneously, an additional $2.5 million in revenue would be likely because the changes would put many individuals in higher income tax brackets.

Table 1 shows the estimated effective tax rates—that is, tax liability divided by adjusted gross income—of the present tax, and the estimated effective rates which would prevail if personal deductions were eliminated, if the tax credit were substituted for the $600 personal exemption, and if both changes were made. If the Legislature does not desire the progressive pattern of burden distribution which these changes would cause, they may readily alter the burden distribution by changing the tax rates.

Other Recommendations

The other changes recommended by the Task Force pertain to the property tax. First, elimination of the statewide levies to support the university system and to raise a small amount of revenue for general expenditure purposes is recommended. The $6 million revenue involved per year would be replaced by other tax sources, preferably the individual income tax. The purpose of this recommendation is to increase the avail-

TABLE 1

ESTIMATED BURDEN DISTRIBUTION OF THE MONTANA INDIVIDUAL INCOME TAX IF RECOMMENDED CHANGES ARE ENACTED
(Percent)

Income Bracket	Estimated Average Effective Rate of Present Tax	Estimated Burden Distribution If Personal Deductions are Eliminated*	Estimated Distribution If $600 Personal Exemption Is Replaced with $6.60 Tax Credit	Estimated Burden Distribution Deductions with Both Eliminated and Use of $6.60 Tax Credit
$ 0-$ 3,000	.3	.6	.6	1.0
3,000- 5,000	.8	1.3	1.5	2.4
5,000- 7,500	1.1	1.9	2.8	3.3
7,500- 10,000	1.4	2.5	2.4	4.2
10,000- 15,000	2.1	3.8	3.2	5.3
15,000- 25,000	3.2	5.0	3.9	5.8
25,000- 50,000	3.7	5.9	4.0	6.3
50,000- 100,000	3.9	6.7	3.8	7.0

*For example, interest contributions and federal income tax paid.

ability of the property tax as a revenue source for financially pressed local governmental units.

Finally, the Task Force recommends the elimination of taxation of certain types of personal property—such as agricultural products held for sale, household goods, and personal effects. At the present time, a large portion of such property escapes taxation, because of the considerable difficulty in identifying the property and placing it on the tax rolls. As a result, there is discrimination against those persons and businesses whose property of these types does get taxed, as opposed to those taxpayers whose property escapes taxation; furthermore, the administrative difficulties of locating these types of property preclude accurate assessment without high cost.

A study by Mr. Howard Lord, a member of the Montana Board of Equalization as well as of the Task Force, concludes that because of the great difficulty of effectively assessing these types of personal property, the only way to avoid the discrimination and administrative difficulties is to eliminate the items from the tax base.[1] The loss in taxable value of only about 2.4 percent of the total could be made up by slightly increasing the tax rate on other property, or by increased state aid to local governmental units.

Summary

It may be seen that the recommended tax changes would provide Montana with an immediate net gain in revenues of over $20 million per year without changing income tax rates—and this amount could be expected to increase over the years as personal income in the state goes up. Further revenue increases could, of course, be obtained by increasing tax rates. Most of the recommended changes would materially reduce the complexity of our tax system and consequently lower administrative and compliance costs. Governmental efficiency would thereby be improved. At the same time, in the opinion of the author, the fairness of our taxes would be increased considerably.

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[1]Howard H. Lord, "Montana Property Tax Assessment Problems," *Montana Tax Study* (Helena, Montana Legislative Council, 1966), Appendix 1 to Part VI.

Montana's Recreation Challenge

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In April of 1966 the daily Missoulian carried an item headlined "Need Exceeds Facilities—Lack of Trailer, Camp Space Decried." The article reported some comments of a state representative, who claimed that "Montana is losing thousands of tourist dollars because demand for recreational facilities by visitors and residents has far exceeded the supply." There followed a fascinating numbers game based on Fish and Game Department figures for District Four, in which ". . . there are presently 986 camper and trailer spaces and by 1970 the need will be 5,168. Of this demand, 650 are for resident need and 4,518 are for tourists." This item is mentioned not because I question the statistics, nor because I think the outdoor-recreation explosion comes as news to anyone, but simply as a lead-in to some of the questions behind such statistics.

We are entering a new era in land management, and I wonder how we are going to handle it. We are still more skilled at cutting trees than growing them, at destroying wildlife than producing it, at poisoning air than purifying it, at contaminating water than conserving it. And now our burgeoning population is descending on every available acre to recreate.

Therefore, of course, recreation is being viewed hungrily as a choice industry for exploitation. Hunters and fishermen spend more than $4 billion annually for services and equipment. Trailers, boats, motors, and water skiis are hot items, as any banker holding the notes can tell you. In a nation where television sets outnumber bathtubs we shouldn't be surprised that the rush is on to develop this new and fertile field. But what *do* the people want?

Many of us are trying to find out: no modern industry is complete without its scientists, and recreation expansion has been accompanied by a predictable ratio of research. It has been said that a typical Navajo family consists of one father, one mother, two children, and an anthropologist; perhaps this

should be analogized into "a typical campsite contains one fireplace, one privy, two garbage cans, and a researcher."

But recreation is a tough area for research because it involves human needs and desires—shadowy and capricious items at best. Simply polling the "user" public to arrive at demand figures is inconclusive—answers often depend on how a question is phrased. And watching to see what people do and then proclaiming such observations as the trend can be misleading. One survey, for instance, showed that two-thirds of today's campers want to be within 50 to 100 feet of the adjacent unit of campers and that some prefer to be only 10 to 15 feet from their neighbors, yet our land-management agencies construct almost all new Montana campsites at 100-foot intervals. I think we are aware that majority actions do not always reflect majority desires—many people have no formed or articulated preferences and follow sheeplike in the tracks of others. In short, no one can really know what the public wants or what the demand will be because the public itself doesn't really know. We must still try to analyze, however, and here the important question is not *whether* those 5,168 trailer and camper spaces in District Four will be filled by 1970, but if so, *why*.

This brings us to matters of quality versus quantity—and I herewith declare myself a spokesman for the quality lobby and quote from some of its leading members. Aldo Leopold said, "The value of recreation is not a matter of ciphers. Recreation is valuable in proportion to the intensity of its experiences. . . ." In W. Leslie Pengelly's words:

> So much outdoor recreation is an aimless pursuit of indefinable goals. When we lose our regard for quality in recreation we will drift into regimented, meaningless, mob-type motions, devoid of the very things we profess to seek.

And enumerating the various components of recreation, Arnold Bolle emphasizes that which ". . . includes activities that enhance understanding and appreciation of the natural world and the history of man." Bolle continues:

> Knowledge of biological and geological forms and processes and of the evolution of man and his institutions in the physical environment are an important facet of recreational experience, as is the *aesthetic response to* these aspects of *landscape and life*.

The last phrase, I believe, describes the fundamental value of recreation—the essence of the rewarding experience. I have underlined the words "aesthetic response to . . . landscape and life," for it is by this means that we are plugged in, so to speak, to our generative and regenerative source. We are if we choose to be, that is; if we can recognize ourselves as products of the land. But in our aggregate case, Mother Nature—like Dr. Frankenstein—may have produced a monster. Let's look at the record:

If there's such a thing as the courtroom of time or the judgment of history, then certainly *Homo sapiens* has been found guilty of landslaughter. We have been gouging and cutting, scarring and gutting our habitat for 4,000 years. In recent times, thanks to advanced technology and species proliferation, we have added poisoning, polluting, homogenizing, and littering to our list of environmental murder methods.

To focus on America and the past couple of centuries: Does a nation achieve a high cultural level by gobbling up natural resources at a rate unequalled by any other society? Do we celebrate the miracle of life—the gift of earth and air and water—by evolving a philosophy of use instead of reverence? If use is the criterion, what becomes of things we consider useless? Why are we always measuring conservation programs in economic terms? Must we justify beauty and cleanliness by a market rating? How have we become victimized by the interests that make us conscious of the cost of everything and the value of nothing? Why are we converting a great and lovely and variegated land into a combination Samesville and garbage heap? Are we civilized, or are we modern barbarians?

Again some words from Mr. Leopold, who wrote nearly 30 years ago that

> . . . years of "progress" have brought the average citizen a vote, a national anthem, a Ford, a bank account, and a high opinion of himself, but not the capacity to live in high density without befouling and denuding his environment, nor a conviction that such capacity, rather than density, is the true test of whether he is civilized.

And what, one may well ask, does all this have to do with recreation?

Not much, if we think of recreation as something to do when

not doing something more important. But a great deal, if we can settle on another definition.

Webster defines recreation as "refreshment of strength and spirits after toil: diversion." If we accept the words "after toil," then recreation becomes an antonym of work, and this aspect has been well documented. L. P. Jacks, an English philosopher, puts it this way:

> We have two major problems to solve in this world. One is labor and the other is leisure; and, of the two, leisure is by far the most important. At labor, we earn a living—at leisure, we learn a life.

And in the Outdoor Recreation Resources Review Commission report, recreation is described as a freely chosen activity which, because it is refreshing and interesting, revivifies the mind, body, and spirit, after which ". . . the individual returns to his work with a sense of renewal."

Certainly the dichotomization of work and recreation explains the residual status of the latter, both in the public mind and in government expenditures. Philip Foss, in a 1965 article in the Natural Resources Journal, speaks of this stepchild position:

> Recreation traditionally has the last claim on resources. The vacant lot may be used as a playground. Lands unsuitable for farming may be left to provide habitat for wildlife. Recreation is customarily permitted on water projects as long as it does not interfere with the 'primary' purposes of the project.

Foss points out that this relegation to second-classism, although at variance with the facts of current demand, derives partially from the American attitude that ". . . productive work (in the Puritan tradition) has high status, while recreation is still looked upon by many people as frivolous and possibly sinful . . . not quite a legitimate activity for adults."

Very fine thinking on the part of all these gentlemen, but if we take diversion (change from routine) as the definition of recreation, then work will *be* recreation when we attain the two-day week.

If we combine diversity with diversion, however, we do indeed have a prime ingredient of recreation—else why such venerable cliches as "deadly sameness," "getting away from it all," and so forth. But current propaganda of the See America

First variety would have us believe that recreation, by Webster's definition, can be a mass experience, one that includes the tedious, arduous, aggregate pursuit of "fun"—the army of family campers, complete with surly daddy, peevish mama, sick, noisy, or sleepy kids, and festoons of milk cartons, peanut-butter jars, sticky tee-shirts, and pink Kleenex that crowds our public campgrounds every summer and makes Times Square look like a Buddhist retreat. What sort of diversity or diversion does such togetherness accomplish? Are these people getting away from something, or taking it with them?

What will eventually happen if the horde of fun-seekers continues to increase? When there's no longer even standing room in Disneyland; when the last wilderness trail has been cemented over; when the outdoor toilets are in mile-long rows, as close as houses on a Philadelphia street; and when parking lots cover 99 percent of every park, what then? After the temples were built in ancient Rome and the emperors ran out of ideas to keep the populace busy, they hit upon a form of outdoor recreation—the games in the Colosseum. Professional athletes amused the crowds, and when appetites become jaded the games were enlivened by the classic lions-versus-Christians episodes. And when that entertainment faded, so did the empire, for it no longer had any goals. Maybe when the Yellowstone mobs get bored with canned speeches and each other we can toss a few park rangers in among the grizzlies at the Trout Creek dump. And then what?

The multimillion-dollar hotels, boat marinas, and superhighways in our national parks have done little to enhance quality recreation for the thousands of people who want to see and show their children the other America—the antithesis of the urban-sluburban smear. How many trailer camps, concessions, turn-arounds, and megalithic washrooms can that other America sustain and still survive as the antithesis? To what extent can we cater to sheer physical numbers of tourists and still serve their spiritual needs?

To examine another aspect of diversity-diversion, we have a compulsion to overorganize our activities, and this can obliterate the element of chance—the very stuff of adventure. Children, and adults, seldom explore—they rarely indulge in the wonderful ambience of "let it happen." Balance the recreation potential implied in "Where are you going? Out. What are you going to do? Nothing." with the dutiful circumscribed "wholesomeness" of Little League baseball, or camp craft, or any of the other parent-chauffered, parent-pressured activities.

Quality recreation, for any age-group, contains something of the casual, the unstructured, the self-discovered.

But back to definition business. Is not recreation more than a leisure-time filler or even a diversion, though it encompasses both? I believe that recreation is a cellular process, and can occur at any moment in life and in any environ—urban, rural, or wilderness. Each experience either stimulates the process or inhibits it. We can be re-created (to use the derivation behind the definition) while at home, at work, or on a trip. We can be re-created in whatever instant we see, hear, taste, smell, or touch something that delights us. I am saying, in short, that true recreation is an inward and very personal response, and that it is activated primarily through the senses.

If this be so, then the quality of environment, in terms of sensory impressions, is paramount. When we see a diamond-bright mountain cracking the sky, a handsome building, amiably situated and rich with the texture of history, a flower-dappled strip of grass along a roadside, a fat horse dozing in a sunlit meadow, or the cloud-scudding prairie horizon, our spirits are refreshed. So too when we hear the wild geese, free-tumbling water, soft firelight voices, a guitar in the night. And so too when we savor a huckleberry, or smell the pine-woods, or feel the summer wind in our hair.

Conversely, when the senses are assaulted by ugliness, cacophony, noisome flavors and fumes—when the reacting mind shivers with irritation or clots with rage—we undergo what might be called de-creation. As President Johnson said in his message on natural beauty: "What a citizen sees every day is his America. If it is attractive it adds to the quality of his life. If it is ugly it can degrade his existence."

About ugliness versus beauty—I won't attempt to define either; both are essentially in the well-known eye of the beholder. There appears to be a consensus, however, at least with regard to natural beauty. How else explain the profound surge of national feeling in favor of the current beautification campaign? This despite George Bernard Shaw's observation that "Americans don't just tolerate ugliness—they have a passion for it." And despite the answer a European gave recently when I asked what surprised him most about this country: "The ugliness of your towns," he said, "particularly in the West, and the filth and clutter along your roadsides."

I think we must be schizophrenic! Nobody really wants ugliness. Even the commercial interests are not positively promoting it; they're promoting immediate profits, and the fact

that ugliness may be an accessory just doesn't bother them enough. Yet commerce and industry are not *per se* the enemies of recreation, but only to the extent (a large extent, alas, in most cases) that these interests are insensitive to environmental quality and irresponsible in terms of their effects upon it.

To condense all the foregoing, quality recreation demands quality surroundings—a habitat that provides natural or man-made stimulus for the human fancy and natural or man-made fulfillment of the human need for beauty. If recreation can therefore be defined as the aesthetic, imaginative response to beauty and diversity, we can tackle the title of this paper.

What is Montana's recreation challenge? Essentially the same as that of any other state—to halt the landslaughter. And this means doing something about the environmental insensitivity and irresponsibility that appear to exist in all of us —the slob element in our human make-up. Will someone tell me why so many of us are such damnable pigs—with apologies to the latter—and why, despite our best efforts to date, the outdoor slums continue to spread like a skin disease across our land? The spectrum of land treatment, from planning (or lack of planning) of developments to haphazard actions of users, has generally been characterized by a disregard for aesthetic values. There will be little left of our attractive America if production continues to be equated with pollution, expansion with congestion, and consumption with despoliation. With regard to the last, and to outdoor recreation, Tom Kimball says:

> The out-of-doors cannot be considered a prostitute for hire. If open space is to be used and re-used by an ever-increasing army of recreationists, the unadorned beauty, magnificence, and cleanliness of each area must be the accepted responsibility and duty of each individual user. Vandalism and malicious mischief with attendant attitudes of befoulment, uncleanliness, and slovenry can no longer be tolerated.

Halting the slaughter also means doing something about our busybody side—the itchy-fingered addiction to growth and development, anywhere and everywhere; the incapacity to recognize the importance or respect the viability of certain existing values. Current examples of the busybody compulsion in action in our area are questionable multiple-use management plans for the Upper Selway and the Lincoln Back Country and

proposed construction projects that would flood portions of Glacier Park, the Bob Marshall Wilderness, and the Big Hole Valley. Here in Montana we even consider impounding the last free-flowing stretches of the historic Missouri River, and in other states we would inundate parts of the Grand Canyon and the great salmon runs and waterfowl breeding grounds of the Upper Yukon. Such proposals should remove any doubts about the second-class status of recreation—of quality recreation, at any rate.

Montana may have some special problems in conserving its recreation resources, partially because the state is so superlatively endowed in this respect. Montanans have inherited a palace—a natural domain of piercing beauty and grandeur, unequalled in all the world. And perhaps, like spoiled little princes, we are careless of our heritage, accepting it thoughtlessly as our due—rejecting the responsibility that should accompany such privilege. I would say that our obligation is simply to protect and maintain the palace, and to furnish it appropriately. To befoul it is criminal; to alter it unnecessarily is shameful. Continuing the metaphor: the slob within us is breaking the windows, defacing the walls, and choking each delicate and stately chamber with refuse—converting the palace into an outhouse. And the busybody is trying to cover the priceless marble with sheetrock, replace the ancient carvings with plastic decals, and install a television set in every room—that side of us would turn the palace into a cheap motel.

If we can't find some other means to control our performance as garbage-strewers, car-body-dumpers, air-polluters, water-poisoners, billboard-erectors, motorized hill-gougers and ear-splitters, stream-channel-straighteners, ticky-tacky-builders, indiscriminate mass-developers, and river dammers, then perhaps it's time to resurrect the Vigilantes. We live in a Garden of Eden—but the snake has most of the lines.

True it is that we are beginning to contend with the situation: we have the Highway Beautification Act, whatever its weaknesses, and some federal anti-pollution legislation. And local citizen-action programs such as those aimed at preserving Blue Mountain as a park area for Missoula are a vital first step. One hopes that such excellent campaigns will expand into an equally vigorous battle against the huge and irreversible modifications of our Montana habitat—the massive water-impoundment projects, ill-conceived urban and highway developments, forestland exploitation, and wilderness attrition.

I believe we must examine the ecological structure of our natural Montana legacy—perceive its variety, its distinction, its promise, its unique beauty and bounty. We pay lip service to all of these, expressing our pride in "The Big Sky Country," "The Treasure State," "The Garden City." But we don't even have an air-pollution act; our mountain, woodland, and prairie fortune is still mis-used and abused; and the scent of Missoula's flowers is lost in the reeking smog.

The recreation planners have quite a task. I hope the fancy definitions and preservatory pleas here offered are not construed as a recommendation for do-nothingism, for they are quite the opposite. Certainly we should be slow to accept profound alterations of the natural environment, for much more is known about *how* to change things than *why*—or than what the effects will be. Besides, as Charles Chaplin said to the girl in "Limelight" who had just attempted suicide: "What's your hurry?" We must be quick, however, to clean up, to protect, to maintain, and to "furnish appropriately"—to combat activities that threaten our recreation resources and to seize opportunities for their enhancement.

Our Stream Alteration Act, for example, must be enforced, or we will lose even more of the state's immensely valuable trout-fishing than we already have. Our Water Pollution Act must also be enforced, for the same and other reasons. And our riparian laws must be amended to include recreation and wildlife as beneficial uses of water. Strong legislation to control Montana air pollution—fast becoming a national scandal—must, of course, be achieved. Efforts at city planning, urban-park development, and proper zoning must be understood and supported, and fast-buck promotional schemes resisted. Facilities for mass recreation, where appropriate, must be conceived and executed with deference to the specific features of the location. Our fragile areas—our jewelled mountain highlands, scenic oases, and small lakes and streams—must be treated with the utmost delicacy.

Much of the above involves politics and professionalism, but behind these is the creative and controlling force of public desire and public awareness (including awareness that recreation probably has the best economic potential of any industry in the state). Realistically, the public interest in protecting our recreation resources must be represented at the state level, perhaps by an advisory board made up of citizens having no exploitative connection with the land. Idealistically, each of

us must be a conservation (synonymous with recreation) vigilante, or our Montana castle, as we know it, will fall.

And the cost of reconstruction—where such is possible—will increase each moment that we delay. The conservation lesson is learned at staggering expense; for example, according to the Saturday Evening Post, it will take $40 billion simply to renovate our nation's waters from the pollution that has already occurred—and this doesn't include industry's costs in handling its own wastes. In the end, we will pay far more for destroying natural values than for preserving them.

A great many recreational issues have been left out of this diatribe, notably, what we should do here and now about the masses of visitors storming our sylvan citadel. That is indeed a difficult question: how to achieve "the greatest good for the greatest number" when nobody knows precisely what the phrase means. But if "good" is related to environmental quality, to opportunities for fulfillment through an "aesthetic response to landscape and life," then perhaps that time-worn slogan can have some significance in our new land-management era.

I will not even speculate on the specific programs, problems, and goals of our recreation planners—the ways in which public agencies and private groups have begun to meet the challenge, but I will deliver one more admonition from Aldo Leopold: "Recreational development is a job not of building roads into lovely country, but of building receptivity into the still unlovely human mind."

Some Economic Aspects of Controlled Burning

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Introduction

In recent years the use of fire as a tool of forest management has been increasing. There are several reasons for this. More intensive management of second-growth areas, and accelerated conversion of static old-growth areas have produced greater quantities of slash which must be disposed of—and one method is by burning. Another reason is that traditional stigmas and fears of fire have been lessened by new understandings from research and experience, so that its use for other than waste disposal has become more widespread.

As long as sixty years ago, a few observers concluded that fire's effects on forests, wildlife, and lands should not be characterized as wholly bad. But most people then felt, as many undoubtedly do today, that intentionally-set fires involved too many hazards to be seriously proposed for inclusion with other management techniques. Many consequences of natural fires are not inconsistent with commercial, aesthetic, recreational, and other social goals. However, many factors—ignorance, prejudice, misinformation, fire protection campaigns, to name only a few—have combined to discourage major, scientific studies of fire's potential usefulness. Not enough data were collected and analyzed so that a skeptic's questions could be answered. Fire suppression methodology was studied intensively while fire as an ecological factor was largely ignored.

For the reasons cited above, it has now become necessary for burning to be understood and to be evaluated along with other techniques of profitable, harmonious timber management. With growing skill in fire-fighting, and with society's willingness to commit resources to prevent wildfires, much of the fear of small, supervised fires has been dissipated. Man has gained mastery over all but the largest of conflagrations and his new

confidence permits him to be more objective and optimistic regarding its utility.

For centuries before the continent was settled, fires ignited from natural causes and spread freely where fuels permitted. Effective, large-scale fire prevention and protection is basically a twentieth-century development. Fires, therefore, have been, and are, an important natural, physical factor in plant and animal species' succession. Many tree species depend on fire for their abundance.[1] In the absence of any protective effort, fires would at least be numerous and possibly devastating. For example, lightning strikes in the western United States typically occur in seasons when the fire danger is greatest. When we prevent fires the destruction of living things may be reduced; but we *are* modifying the ecological system—the relationship between animals, birds, plants, bacteria, and soils—possibly for the better, but not necessarily. The argument that intentional fires must not be countenanced because "they are destructive of nature" is transparently inaccurate. Fires are part of nature. When we tamper (via suppression and protection) with such a delicately interrelated systemic balance, we pay a price. Unfortunately, not enough is known at present for us to be able confidently to make a categorical judgment as to what that price truly is or whether it is much greater or much less than for alternative practices.

Normally, we can identify changes in microcosms more readily than in a system itself. We know, for example, that the grizzly bear, a plains animal, has been driven into the mountains with the encroachment of civilization and the fencing of ranges. His present, unnatural habitat has been forced by man and his survival is precarious. Similarly, limited access highway construction has affected the mobility of many game animals. Whether such changes seriously disadvantage man's interests, as well as the animals', perhaps is worthy of investigation. Similarly, for centuries in many lands, selective cutting of timber has been practiced. In its worst form, superior tree specimens have been utilized for wood products. Regeneration then is provided from within the stand by seeds from the inferior and smaller-sized stems that remain. If there were a change in the quality of seedlings, or of the spe-

[1]Fire is a major element in determining the abundance and distribution of western white pine, eastern white pine, lodgepole pine, longleaf pine, loblolly pine, pitch shortleaf pine, Ponderosa pine, Jack pine, Douglas fir, paper birch, western larch, quaking aspen, black spruce, and other species.

cies mixture, the average quality would decline with the removal of the more desirable seed strains, and the new species balance would favor those of lesser commercial value. This example is a further illustration of the kinds of subtle changes which may be very difficult or impossible to document and whose ramifications in the total system are precluded from this discussion.

It is clear that, for a proper assessment of fire and its role when serving man, some notion of a proper perspective and a reasonable value system are imperative. It is not enough to point out that fire can be immensely useful—to clear or to thin trees and brush, to dispose of debris and reduce a potential fire hazard, to improve forage, to prepare range lands, to stimulate sprout growth, to provide food and cover for wildlife, to suppress insects and disease, and even to improve recreational opportunities. One must ask how other values have been altered by fire. The directly visible and determinable values may be of lesser consequence than others which are more subtle and less quantifiable, but nonetheless real.

Some forest industry managers take the position that when controlled burning is safe, it is not necessary because these areas can be protected for less than the cost of burning; and, alternatively, where burning is indicated, it is too dangerous to be practicable. This kind of broad conclusion is fallacious because it is made only from the point of view of fire hazard cost considerations. There are other costs involved as well, and, more importantly, other benefits.

Among the several elements which are pertinent in developing decision criteria when burning may be indicated, one is often ignored—the time element. Fire produces both good and bad effects. It makes an enormous difference whether we speak of fire's consequences after one year, ten years, or one hundred years. After a century, all burns might be judged beneficial; a month after burning, all fires might be regarded as improvident. The type of forest cover that eventuates in the aftermath of a fire (wild or intentional) is not always predictable. It depends upon numerous geographical, topographical, climatological, and other factors including the characteristics of the fire itself (the intensity of heat or the

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Note: By controlled burning, we mean the various types of intentional fires which are set under conditions which enable man to exercise control and direction over effects and influences. This definition is generic and is intended to encompass broadcast and prescribed burning techniques, for example.

exposure of mineral soil, for example). The problem of assessing the effects of a fire upon the forest cover is a multidimensional one which requires a relatively sophisticated approach. It is hoped that this essay may indicate a direction for study and, as well, some of the issues.

The Effects of Controlled Burning

In this paper, a narrow framework will enable us to evaluate more effectively the consequences of fires; we can compare the goals sought with the outcomes realized.

The purposeful fire, the accidental man-caused fire, and the mindless, nature-set conflagration may all kill many living things (trees, brush, grass, birds, insects, animals, fish, microorganisms), or they may only damage them. Damage to trees, to illustrate, might include pitchy butts, high stumps, heart rot or conk, root rot, bud scorching, defoliation, or bole injuries. There is increased likelihood of harm to large trees, after a burn, from lightning, frost cracks, and so on. (Some of these aftereffects may, however, be consistent with pruning, thinning, and sprout growth objectives.) Similar detailed lists of harmful effects could be prepared for the other ecological elements. While it is true that all fires tend to be nonselective, controlled burning does minimize the likelihood of fortuitous damage.

It is not within the scope of this paper to catalog all of the possible ecological consequences of even a friendly fire. The study of living organisms and their relationships with environments is exceedingly complex. For example, the extensive West Coast Douglas fir forest owes its very existence to fires over the centuries.[2] Since this fir is a commercially valuable species, repeated harvests (and regeneration) prevent the natural succession of (presently) less valuable species to the climax forest. A fire tolerant species in another area may not

[2]C. F. Cooper, "The Ecology of Fire," *Scientific American,* Vol. 204, No. 4 (April 1961), p. 151.
E. I. Kotok, *Fire—A Major Ecological Factor in the Pine Region of California,* Fifth Pacific Science Congress Proceedings (Vancouver, B. C., 1933), Vol. 5, pp. 4019-4020.
R. K. Lebarron, "Silvicultural Possibilities of Fire in Northeastern Washington," *Journal of Forestry,* Vol. 55, No. 9 (1957), p. 627-630.
H. Weaver, "Ecological Changes in the Ponderosa Pine Forest of the Warm Springs Indian Reservation in Oregon," *Journal of Forestry,* Vol. 57, No. 1 (1959), p. 18.

reestablish itself after cutting; the replacement species often are "weed" trees in a commercial sense.

Since the scope of this paper is limited, we will discuss only the effects of *controlled burning* under the headings of organic, physical, and social changes.

Organic Effects

Fire removes some of the soil-protecting litter and humus. The consequent reduction of competition for nutrients and the sprouting of fire-killed larger stems account for the forage increase. If soil is exposed to compaction by rain and animals, soil temperatures are likely to be higher. Blackened (burned) areas will absorb greater heat than will soil covered by heavier layers of (unburned) duff and branches. The rise in soil temperatures has the effect of extending the growing season; and, plant growth is accelerated due to the reduced competition for nutrients and moisture. Controlled burning may be consciously programmed to produce the same effects.

Fire has already been shown to be a useful tool for the removal of undesirable species of competitors with Ponderosa pine and, at the same time, it may permit less demanding competitors and more desirable plant species to return to the burned area.

In many circumstances, the removal of logging slash or other debris by fire is the least costly alternative. At the same time, a fire of the proper intensity will expose the mineral soil and thereby provide the proper seedbed for regeneration. Similarly, properly set and supervised fires may "release" trees growing in stagnant clumps or remove dense litter economically.

Fire must change any ecological equilibrium or balance: it alters the species mixture and dominance, but it affects the growth and yield of tree species differently. Studies have demonstrated that quail, moose, elk, and deer prefer subclimax forest types for protection. Removal of mature, stagnant climax types will offer new opportunities for sustaining wildlife. For some years after a fire, there usually is increased food for animals but this nutrition gain might support domestic stock as well as game animals.

Plants as well as trees may be released from suppression, *i.e.*, increase their rate of growth. If post-fire conditions do stimulate grass growth, it will probably be more succulent

and nutritious because of fire's effect upon the protein content. Before man's arrival in forested areas, wildfires had an important "management effect." Progressive and successive burnings that were in part a function of fuel supply and tended to be geographically dispersed, helped to distribute animals throughout a forest; new burns produced attractive forage and tended to lower the probability of overgrazing in other areas.

Finally, one of the side effects of the educational "Smokey the Bear" fire protection program, must be mentioned. The very effectiveness of this campaign over the years has produced an enormous buildup of litter, wind-thrown trees, slash and snags, which has created a dangerously high wildfire hazard in some of our forests. Such campaigns must be increasingly effective in reducing the number of man-caused accidental fires or they will not offset the conflagration probability which is rising annually. Controlled burning is often effective and economical in reducing fire danger from increasing quantities of flammable materials.[3]

Physical Effects

Controlled burning may affect the water-holding capacity of the soil, the exposure and movement of soil, and may even change its character. Water flow is the amount of precipitation that is not retained by the forest or its soils. The use of water by vegetation is altered by fire. Contrary to popular belief, controlled burning does not necessarily increase water runoff since in most fires not all of the litter and duff are destroyed. Almost immediately, forbs and herbs return to the exposed area and limit the amount of "splash" erosion. With the partial removal of thick litter and duff layers, the infiltration capacity of soils may even be increased—which would reduce the volume of water that is lost through evaporation or rapid runoff.

Fires also have an effect upon cloud formations, wind di-

[3]In addition to the accelerated breaking down of organic material, fires can stimulate the nitrofication of the soil; they can increase the pH level of available ions in the soil (soil acidity is lowered by the ash fall); and they can stimulate the calcification of mineral soils. One reviewer stated: Fire can increase the populations of nitrogen-fixing bacteria in the soil by increasing soil pH. . . . However, pH increase is transient. Symbiotic fungal populations are scarcely affected. Most prescribed fires have little effect on soil character.

rection and velocity, and air and ground temperatures. Smoke may contribute to pollution problems and, by creating condensation nucleii, may add to the cloud cover. Hence, fires may affect the distribution of rainfall.

There is normally a net reduction of fuels in an area immediately after a fire. A controlled burn should reduce the fire hazard in that location because it removes flash fuels. Unfortunately, this is not always the case, since the fire may kill living materials (but not consume them) that would otherwise be more fire resistant. Fires reduce the amount of material available to make humus which, in turn, affects the absorption and moisture-holding qualities of the soil and the incidence of erosion. The removal of surface fuels should affect adversely the opportunity for wildfires to spread. However, the burning of dead vegetation usually promotes the growth of new plants within a short period of time. Whether this is good or bad depends upon the amount and type of growth that is fostered.

Social Effects

It should be obvious that many of the effects stemming from orderly burning are good reasons for using fire as a forest management tool. Except for range managers, a few foresters and timber operators, most people, despite the relevant facts, "know" that fires are evil. It would require a major campaign even to gain people's attention regarding fire's values, let alone to persuade them as to the merits of fire as a management technique, and one which might also advance their interests.

It is, nonetheless, true that intelligent fire use may enhance commercial and aesthetic recreation values. Fires may add to the recreation productivity of lands suitable for hunting, hiking and camping. They can improve access for men and equipment to forested areas for fire protection and for inspection. Overmature forests with dead fall and windthrown trees, with low branches and brush tangles hampering surface movement make fire fighting more difficult and hazardous. In a controlled fire men can be placed advantageously ahead of time to fight fire in a given area and thus reduce the suppression costs of wildfires. If there is less flammable or flash fuel, a wildfire is less likely to move swiftly. This increases the time available for men and equipment to reach the fire before a "blow-up" occurs.

Controlled fires may reduce or eliminate the need to incur planting or inter-planting costs. More exposed mineral soil provides a proportionally greater germination rate for a given volume of seeds, whether from surrounding trees or by a broadcast method. Under proper conditions, controlled burning, when used with other desirable silvicultural practices, may increase the opportunity for commercial thinning and pulping activities which are good conservation and utilization goals.

The conflagration hazard *may* be lowered by breaking the fuel distribution chain—from grass to brush to seedlings to saplings to mature trees. Controlled burning can eliminate the vital first two or three links in the development of crown fires. As mentioned previously, a failure to remove the yearly accumulations of litter (some stands of Ponderosa pine may add nearly a ton of flash fuel material—needles, bark scaling, small branches—per acre per year) means that the fire hazard must increase. Also, many tree species are resistant to decay bacteria and take many years to decompose. Most species will break down much slower in dry climate regions so that litter can be a fuel source for long periods of time if it is not removed.

This situation is not unlike the economic theory described by Keynes; that is, in the attempt to save more money as a society we may actually save less. The parallel observation can be made regarding fire protection. If we try to prevent all fires (to minimize fire damage), we will permit the buildup of excessive quantities of fuels to the critical point so that, when a fire does occur, we may be unable to suppress it. The values lost in conflagrations which *cannot* be contained may well exceed the commercial timber values saved by fire prevention over the years, especially if we include the costs of protection efforts, suppression expenditures, and controlled burning expenses.

A Larger View of the Problems

Over the years, forest managers increasingly have used controlled burning in our forests; in the Northwest the acreage burned intentionally is from three to five times greater than the area consumed by wildfires. But the decision to burn often is made solely to dispose of waste (either because it is unsightly or to reduce the fire hazard); this practice does not take into account the multiple ramifications of burning.

One expert observed that "at the present time we do not know what constitutes a *good* burn or why." This writer was

led to make the naive assumption that it should be fairly simple to identify the variables, especially the control factors, to quantify and qualify them, to determine relationships, and to propose a model which would state the general case for an effective burning program. It was not so simple. Research proved that there were serious gaps and contradictions in the published data. Only long periods of observation and assessment could show the subtle interrelationships in the ecology of burned areas—and even then there were no absolute standards to give meaning to the judgments made. One cannot find definitive responses to the questions of "value to whom, in what terms, and at what time?" There is no consensus on what is possible, let alone on what is desirable.

Fuel quantities, types, and characteristics that affect combustibility, ecological relationships, moisture conditions of the soil and fuel, weather and climate, timing and age factors, topography and geologic state, frequency and type of prior burns, fire prevention and suppression techniques, planning effort and luck, forest technology, and management objectives and the public will must all be studied systematically. Each of these elements, in fire behavior and results, is a formidable area for analysis, which must be pushed ahead before intentional fires can properly be evaluated.

Similarly, and equally important, inquiries must be made on the same scale of breadth and intensity of all the alternatives to burning. One must know the relevant costs and benefits of the many substitute practices, other than setting fires, in order to establish the opportunity costs of burning. An opportunity cost of *not* burning, for example, might be the encouragement of disease and insects in the presence of decaying wood fibre. The choice, however, is not simply whether to burn or not; there are many types of fires varying in heat intensity, opportunity for control, degree of combustion, and so on. One should be able to choose, when fire *is* indicated, the type that offers the greatest net advantage.

These are decision problems in the classical economic tradition. The financial, manpower and equipment resources for timber management and fire use are limited; managers must allocate their use among competing and often contradictory ends. Unfortunately, not enough is known about fire as a tool and there is too much diversity of opinion on the general goals to be sought for forested areas. For example, what is the minimum number of acres that should be supporting trees to meet our society's needs? What are the effects of the trans-

piration process in cleaning or fouling the atmosphere? What is the acreage required to maintain a flow of wood fibre to meet our changing product needs—in the light of expanding technology which offers so many wood substitutes? What is the maximum acreage that our country can afford to support economically?

Perhaps a better question is not how many acres (and where) but rather the cubic volume of fibre we must have. How healthy are the trees and well-stocked the lands compared to what can be supported? Even with fewer acres in production and fewer trees per acre we could have greater output if the trees were more resistant to insects and fungi. How much of our forests should be in managed stands as opposed to more or less natural conditions (all-aged trees with mixed species)? What are the ecological and social consequences of raising trees as a crop (even-aged trees with limited species)? Should only the economic values be measured?

Possibly the fundamental question to ask is what does or can a forest do? And then, how should we place values on its stream of benefits? While the purposes of tree farms may be laudable, the forests are being changed qualitatively in ways that are importantly different from natural processes. The centuries-old giant trees (and the ecology that supports them) will not be with us in future generations. Rotation ages are being constantly lowered. Economic considerations dictate clear cutting; hence, the oldest trees in a commercial stand after the initial harvest likely will be between sixty and eighty years of age. In many cases, the species mixture that replaces what is cut is accidental; seeding, planting and thinning are not universally practiced. Will the forest of the future, determined in this fashion, resemble even distantly in appearance or in value what could or should be obtained?

What management practices are best for the forest ecology and/or man? To answer this question, some foresters justify their practices in terms of producing a "normal" forest. But "normal" is meaningless when applied to a dynamic subject. At what point in time, and under what conditions? There is no beginning or end to the process of adjustment.

Total forest values apparently will be increasing substantially in the future. In the short run the supply of land devoted to, or available for, the growing of trees is relatively fixed. The demand for forest services and products, though, is increasing to meet the needs of a growing population, changing tastes, and rising real incomes. Not too many years ago,

much of our forest resource was valued chiefly as a storehouse of raw material. Today, with more complete utilization, better access roads, and the press of people, other values have soared. In the future, our forests may be valued more for recreation, or for watershed management, or for air pollution abatement, or a number of other services, than for the industrial and commercial products which can be produced. If this is true, forest stewards should recognize and reflect these possibilities in their over-all planning; even the choices of alternative operational techniques (such as burning) should also be made from this broader perspective.

Conclusions

Since approximately one-third of the United States is forested, management practices (or their absence) on these lands are of considerable interest and significance for all citizens. As a people we derive numerous satisfactions from our forests and occasionally suffer economic and social losses from them either from mismanagement or through accidents. Thus, it is proper that questions be raised whenever important policy decisions are faced. Once the decision to clear cut a virgin, mature stand of trees has been made, it will be centuries (if not thousands of years) before the *same* decision opportunity arises again. Timber managers face an awesome responsibility when they must make these decisions; historically, their performance has not been outstanding when judged by present standards. We should be giving thought now to the standards by which current practices will be evaluated by our children in years to come since we cannot revoke our actions.

In the case of controlled burning, we do not know with certainty whether we are using fire too much or too little at the right times or in the proper places, or with the correct frequency. There is disagreement on the effects of fire. Fire behavior under certain conditions has not even been studied. With an adequate financial commitment it will be possible, ultimately, for resource managers to make the wise judgments we need on the basis of fact instead of conjecture.

Many individuals are interested in the problems cited and the growing body of fire literature reflects the expansion of research. The U. S. Forest Service is the most active force at the moment in its several fire laboratories and forest and range experiment stations. Individuals in some universities,

in a few foundations, and in some state agencies have made worthwhile contributions.

In summary, it is evident that fire must be evaluated in a context much broader than most people have employed in the past. A fundamental notion in this review, then, is that fire is a multiple effect agent which acts upon a system. Secondly, successive delayed reactions to fire compel the analyst to extend his appraisal time in order to take them into account. Thirdly, fire is nondiscriminatory in nature; that is, under most circumstances it will consume or kill much that is desirable as well as materials which are the principal object for removal or modification.

The source of ignition, *per se*, does not influence the course of fires; this is determined by the many factors enumerated, which may either increase the opportunity for burning and affect the intensity of a fire or serve as constraints upon its occurrence and degree of development. Lastly, it is neither useful nor accurate to categorize accidental fires as destructive and intentional fires as beneficial; in their worst and best forms they always involve a mixture of desirable and undesirable consequences.

This study, which was conceived as an indignant polemic against the indiscriminate use of fire, progressed to an appreciation of fire's utility and functions. Finally it became an essay on the necessity of understanding more about combustion and its consequences, the importance of evolving criteria for judging the effectiveness of fire and its alternatives, and the urgency of articulating society's objectives as guidelines for forest managers.